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THE

# JOURNAL

OF THE

ROYAL GEOGRAPHICAL SOCIETY

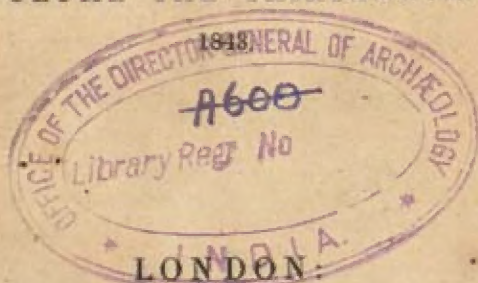
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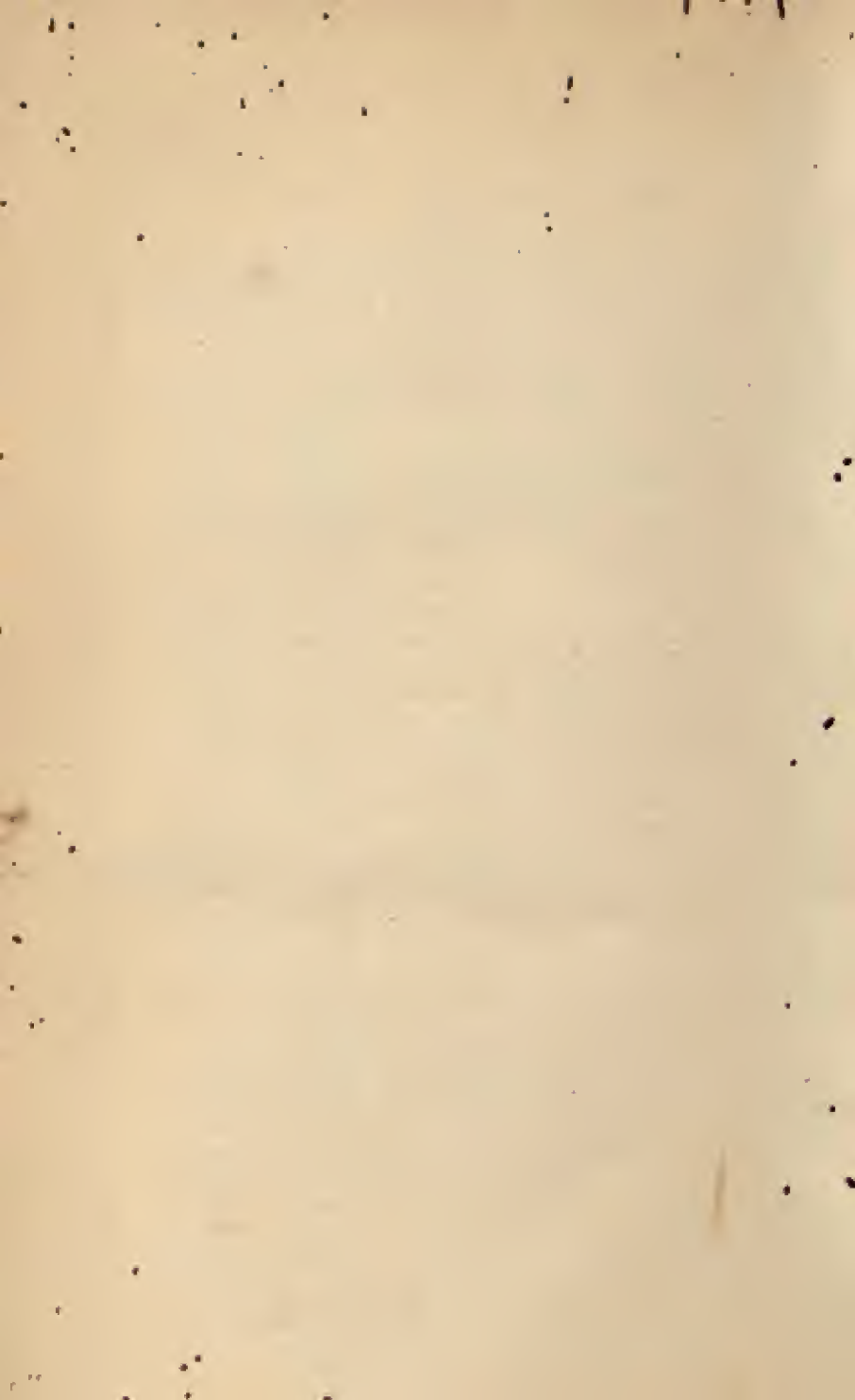
## ERRATUM.

Page 182, note.—For Captain *Harris* read *Haines*. The mistake is obvious, for Captain Harris was not nominated in India to the Shoa mission till after Dr. Beke had transmitted his map of that country.



# ERRATA.

- P. 272, l. 3 from bottom, for "Djabyk Kumzai," read "Djabyk Karagai."  
P. 275, l. 3 from top, for "Krasnoe Ufinak," read "Krasnoe Ufimsk."  
P. 279, l. 35 from top, for "Ai," read "Ui."  
P. 283, l. 36 from top, for "Kana," read "Tana."  
P. 286, l. 15 from top, for "Salkas," read "Saska."  
P. 290, l. 14 from top, for "Liro-raga," read "Lipova-gora."  
P. 291, l. 27 from top, for "left bank," read "right bank."  
P. 292, l. 39 from top, for "Askin-ca," read "Askin."  
P. 293, l. 36 from top, for "right bank," read "left bank."  
P. 294, l. 12 from top, for "Masharysh," read "Makarysh."  
P. 295, l. 16 from top, for "Tokata," read "Takatchi."  
P. 296, l. 33 from top, for "Yurezyk," read "Yurezen."  
P. 303, l. 9 from top, for "Redoubt Toltai," read "Redoubt Sheltoi."  
P. 307, l. 21 from top, for "prolongation," read "chain."  
P. 313, l. 4 from bottom, for "Tama," read "Kama."  
P. 314, l. 11 from top, for "Salmij," read "Salmish."  
P. 315, l. 29 from top, for "Kychui," read "Kutchui."  
P. 316, l. 13 from top, for "Metcha," read "Motcha."  
16 from top, for "Shurana," read "Urana."  
18 from top, for "Borovka," read "Bobrovka."  
23 from top, for "Sergush," read "Sergut."  
P. 317, l. 4 from top, for "Salmij to S.S.W.," read "Salmish to S.S.E."  
5 from top, for "S.S.W." read "S.S.E."  
6 from top, for "S.S.W." read "S.S.E."  
P. 318, l. 7 from top, for "Tanyr," read "Tanyt."  
P. 319, l. 4 from top, for "Jilkuar," read "Jilkurar."  
P. 320, l. 4 from top, for "Taguzak," read "Taguzak."  
5 from top, for "Ayak," read "Ayat."  
10 from top, for "Shvanduk," read "Sunduk."  
13 from top, for "Etakla," read "Yurukla."  
23 from top, for "Taguzak," read "Taguzak."



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Patron.

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# Royal Geographical Society.

1843.

## REPORT OF THE COUNCIL.

THE Council have to report that, since the last Anniversary Meeting, 16 new Members have been elected. The vacancies in the same period amount to 14, of which, 6 by death and 8 by resignation.

The Society now consists of 655 Members, exclusive of 60 foreign Honorary and Corresponding Members. The Council have to deplore the loss of the Vice-Patron of the Society, H. R. Highness the Duke of Sussex, who, since the commencement of the Society, had been pleased to honour us with his name and patronage. The Council have also to express their regret for the death of one of their distinguished foreign Honorary Members, the Count Alexander L. J. Laborde, Member of the French Institute.

*Finances.*—The Society will observe, by the accompanying balance-sheet, that the expenditure of the last year has been restricted to the lowest amount consistently with the indispensable requirements of its operations; notwithstanding which it was found at the end of the financial year, in December, 1842, that there were outstanding claims to the amount of 578*l.* 11*s.* 6*d.*, of which sum the greater part is strictly chargeable to 1841, the Journal of that year not appearing till 1842. Indeed the expenditure of 1842 was 76*l.* 6*s.* below the estimate, which was itself exceedingly low as compared with the estimates of former years. One principal reason of this apparent anomaly is to be found in the dilatoriness of Members in paying their subscriptions, and in the amount of arrears due by Members abroad: the whole arrears amounting, on the 1st of January last, to 500*l.* Had this sum been received, the Council would not have been under the necessity of again trenching on the vested funds of the Society.

which they have done by the sale of 580*l.*, the amount of the deficit. But while the Council hope that a great portion of the arrears will eventually be paid, they have thought that the character of the Society required that the just demands upon the funds of the Society should be settled forthwith; it being most desirable indeed, on every account, that the Society's financial affairs be brought to such a state that the expenses of each year be paid, if possible, by the receipts of that year; so that at the close of each year, the Society, even if less rich in funds, may have the satisfaction of being without debt. After the present year, it is hoped that such will be the case. We say after the present year, because, in order to get up our lee-way as respects the publication of the Journal, there will be three numbers in the present year, and subsequently but two.

*Arrears.*—With regard to the arrears which, as above stated, were on the 1st of January 500*l.*, there has been paid in since 80*l.*

*Money Grants.*—No money grants have been made by the Council since that of 100*l.*, mentioned in the report of last year as made to Dr. Beke. It has been paid within the last ten days in pursuance of the wish communicated to the Secretary by that enterprising and successful traveller.

*Royal Donation.*—Of the two gold medals, forming the donation of Her Most Gracious Majesty, that called the Patron's Medal has been awarded to Captain Symonds, of the Royal Engineers, for his triangulation over a great portion of Palestine, and for his determination of the difference between the level of the Mediterranean and that of the Dead Sea; and that called the Founder's Medal to Mr. Eyre, for his enterprising and extensive explorations in Australia, under circumstances of peculiar difficulty.

*Journal.*—We have already alluded to the Journal.—It is well known to the Society that we have been obliged, from financial considerations, to revert to the practice of issuing but two parts annually. The delay, however, which occurred in the publication of the 10th Volume has rendered it expedient to publish three



Parts in the present year—namely, the 2nd Part of Volume 12, which should have appeared in 1842, and the two Parts of Volume 13; when the desired regularity will be re-established. It is hardly necessary to bring again before the notice of the Society, that each Member receives back, in the shape of the Journal, fully one-half of his annual contribution.

Your Secretary has for some time been engaged in the very laborious occupation of preparing a detailed index of the contents of the first ten volumes of the Journal, which he has nearly terminated. The want of such an index has long been felt; but as our funds do not admit of our incurring the expense of printing this index, which will form a volume of itself, and delivering it gratuitously to the Members, it is proposed that such Members as are desirous of having it at cost price give in their names, when, if the number be sufficient to cover the expense, it will be forthwith sent to the press; and with this view a Prospectus will be prepared, under the superintendence of the Council, for the information of the Society.

*Library.*—The accessions to the library since the last year consist of 417 volumes, and 206 maps and charts; of these last, thirty have been presented to us by the Hydrographic department of the Admiralty.

Our library and collection of maps are now of very considerable extent and value; but the Council regrets exceedingly that many of those valuable documents are likely to be injured for want of the means of keeping them in that state which shall ensure their preservation. Many of the books require to be bound, the more particularly as, being lent out to numbers, they soon become deteriorated, if left in boards. Many of our maps and charts require mounting, others require portfolios; but, in the present state of the Society's finances, the Council, being of course very unwilling to trench upon the funds of the Society beyond what is imperative, cannot at present warrant a sufficient outlay for that purpose.

## BALANCE-SHEET FOR 1842.

Dr.

Cr.

	£.	s.	d.		£.	s.	d.
Balance, January 1st, 1842, in the Banker's hands	209	6	11	House Rent and Fixtures	263	13	0
Balance of Petty Cash, in the Secretary's hands	32	0	6	Salaries of Secretary, Editor, and Librarian	425	0	0
Entrance of 18 Members, at 3 <i>l</i> .	54	0	0	Collector	21	0	0
Composition of 6 Members, at 17 <i>l</i> .	102	0	0	Messenger's Wages	26	0	0
Subscription of 257 Members, at 2 <i>l</i> .	514	2	0	Fire and Lights	19	0	4½
Arrears paid up	48	0	0	Stationery	19	0	7
Dividends on 3150 <i>l</i> . Stock, 3½ per Cent. Reduced	108	12	11	Freight, Duty, Carriage of Parcels, Postages, &c.	44	11	11½
Royal Premium	52	10	0	Evening Meetings	16	10	3
Journals sold	71	11	6	Insurance and Advertisements	5	5	0
Mr. Alexander's Donation	50	0	0	Instruments for Travellers	5	15	0
				Furniture, Repairs, and Fittings, and Hire of Chairs for Evening Meetings	22	7	11
				Journal for 1841 (Printing 141 <i>l</i> . 18 <i>s</i> ., Illustrations 89 <i>l</i> . 16 <i>s</i> ., Translations 22 <i>l</i> .)	253	14	0
				Miscellaneous Printing	9	19	0
				Books, Maps, and Bindings	32	5	1
				Royal Premium	46	10	0
				Sundries, as Christmas-boxes, &c.	1	0	6
				Balance in the Banker's hands	30	11	2
					£1,242	3	10

The above Accounts have been compared by us with the corresponding vouchers, and found to be correct.

JAMES MEER, } *Auditors.*  
 WM. CHATTERTON, }  
 JOHN BIDDULPH, *Treasurer.*







## : PRESENTATION

OF THE

## G O L D M E D A L S,

AWARDED RESPECTIVELY TO LIEUT. J. F. A. SYMONDS, R.E., AND  
TO MR. EDWARD JOHN EYRE.

Sir WM. SYMONDS being present to receive the Medal for his son LIEUT. SYMONDS, now abroad, the President addressing him said:—

“SIR WM. SYMONDS,—It is impossible that I can find expressions for the pleasure I feel in addressing from this chair an old friend on a subject so near and dear to his heart. You have kindly presented yourself on this occasion to receive, in the name of your absent and accomplished son, Lieut. J. F. A. Symonds, of the Corps of Royal Engineers, one of the gold medals which the bounty of the Queen enables the Council of the Royal Geographical Society annually to award to those who have distinguished themselves in advancing the cause of geographical science. Your son, Lieut. Symonds, has so distinguished himself; and his name is for ever enrolled amongst those who have thus made firm and solid advances towards a true determination of geographical data on one of the most interesting portions of our globe.

“Finding himself in the course of service on the coast of Syria in 1840, after the active hostilities of that year were brought to a close, Lieut. Symonds, who had been early taught to spurn inglorious ease, and being now in a country full of the most stirring reminiscences, where he had already assisted in the surveys of Jaffa, Sidon, Acre, and Jerusalem, was fortunate enough to be selected by his commanding officer to undertake the survey of a portion of Syria: and the result of his labours in the year 1841, notwithstanding the interruption occasioned by fever, was the triangulation of the country between Jaffa and Jerusalem; and thence to the head of the Dead Sea on the S.; and from Cape Blanco to Saffet and the Lake Tiberias on the N.; these two main lines being connected by intermediate triangles. In the northern part of the country the topographical features, with the towns and villages, have been laid down in detail, and with minute exactness. Whilst the operations were going on, Lieut. Symonds, being supplied with an 8-inch theodolite, was enabled to ascertain the difference of level between the Dead Sea and the Mediterranean, and also between the Lake of Tiberias and the Mediterranean: the Dead Sea being 1312.2 feet, and the Lake of Tiberias 328.98 feet below the sea on the nearest point respectively.

The solution of this problem, which has been a subject of discussion amongst geographers and travellers for the last ten years and more, and to the importance of which, as a remarkable terrestrial phenomenon, Alexander von Humboldt makes a very particular allusion at the close of the third volume of his last work on Central Asia, forms an important era in the history of geographical knowledge; and it is to your son a most honourable commencement in that useful career of applying mathematical science to practical purposes, in which you, in a sister service, have so nobly pointed out to him the way.

"I beg leave to place in your hands the Patron's gold medal, awarded to your son by the Council of the Royal Geographical Society for the promotion of geographical knowledge."

To which Sir Wm. Symonds replied :—

"Mr. President,—In the name of my son Lieut. Symonds, I beg to express the most cordial acknowledgments for the kind feeling that dictated the flattering address which you have just pronounced on the subject of my son's labours in Syria. I rejoice that his indefatigable exertions have merited the high honour which the Geographical Society have been pleased to confer on him; for his zeal in the pursuits of science only yields to love of his profession.

"Allow me also to mention that, while he was proceeding with his triangulations in the Holy Land, he expressed a strong desire to be employed in ascertaining the level of the Caspian Sea, which has long been a question very important to science, and is still an object of much interest to all geographers, former attempts having failed owing to the want of a proper instrument. If my son should be fortunate enough to be selected for that service, and have the same instrument which was entrusted to him in Syria, I have no doubt that he will solve the question, and deserve the further commendation of the Royal Geographical Society."

Mr. Eyre being in Australia, the Medal was received for him by the Secretary. The President said :—

"In presenting to the representative of Mr. Edward John Eyre the Founder's Medal, awarded to him by the Council of the Royal Geographical Society, the Council are happy to mark it as the first instance, in which such token of their approbation has been bestowed for discoveries in a part of the world first made English by our great circumnavigator Captain Cook, and which throughout its immense extent has already been the scene of many a daring adventure and hardy enterprise, not surpassed by any of those which have been exhibited by our countrymen in every other portion of the globe.

"In 1837-8 Mr. Eyre distinguished himself by an attempt to penetrate into South Australia from New South Wales, by the Murumbidgee, Australia Felix, and the Wimmera; following down the latter river until it should fall into the Murrumbidgee, or the sea. In this journey he discovered the fresh-water lake Hindmarsh, but could only reach South Australia by retracing his steps through Australia Felix, and by the Murray.



"In 1839, Mr. Eyre started from Port Lincoln in South Australia, to determine the practicability of an overland route to Western Australia; but he was driven back by want of water and the difficulties of the country; and on his route directly across from Streaky Bay to Spencer's Gulf, he discovered a mountain range trending from N.W. to S.E., towards the different points from Middle Back Mountain to Elbow Hill.

"Proceeding to the N. of Spencer's Gulf, he discovered that extraordinary geographical feature, Lake Torrens: this put an end to his progress in a northerly direction; on which he returned to Spencer's Gulf and struck across the country to the Murray.

"Again, in June, 1840, ever ready to the call of the colonists, who wished to know what were their locomotive powers, what bounds were set to them, and whether the traversing of this great continent from S. to N. was in truth feasible or not, Mr. Eyre returned to the head of Spencer's Gulf, where, at the foot of Mount Arden, he had formed a depôt; thence having advanced for 400 miles along the eastern bank of the Lake Torrens, he was again obliged to desist; and in the view of making a second struggle (as he could do nothing to the northward) to penetrate towards Western Australia, he sent some of his drays by his old track to Streaky Bay, and himself repaired to Port Lincoln to complete his preparations for a second attempt to reach King George's Sound. The hardships and sufferings experienced by Mr. Eyre in carrying out this project were beyond description; the whole distance being above 1000 miles, full one half of it entirely destitute of water, and consequently of herbage or fruit, the only scanty supply of the former in this dreary waste being obtained by digging in the drifts of pure white sand found along the coast at places where the great fossil bank receded a little from the immediate margin of the sea. Mr. Eyre describes the table-land of the interior to be of the most desolate and barren character imaginable, almost entirely without grass, destitute of timber, and in many parts densely covered by an impenetrable scrub. On two different occasions the party were entirely without water for seven days, and almost the same time without food. In the latter half of the journey Mr. Eyre was only accompanied by one person, a native of King George's Sound: three native youths having deserted from him in despair, after they had murdered the overseer, who was attempting to detain them.

"Mr. Eyre mentions, in terms of merited thanks, the kind conduct of Captain Rossiter, commander of the *Mississippi*, a French whaler, who, near the western extremity of the great Australia Bight, gave him hospitality on board his ship, recruited his horses, and provided him with supplies for prosecuting his journey to King George's Sound. The expedition from Fowler's Bay on the frontiers of South Australia and Western Australia occupied the whole time from the 25th of February, 1841, to the 7th of July; and though, as Mr. Eyre confesses, his labours had not been productive of any discovery likely to prove beneficial to the colony, we, as geographers, are not the less inclined to give him our tribute of applause for the obstacles he overcame, and for having sent home a large addition to our knowledge of the geographical features of this anomalous portion of the globe.

The Medal was then handed to the Secretary, who replied:—

“Mr. President;—I receive with unfeigned pleasure the commission of forwarding to Mr. Eyre this valuable testimony to his merits as a most zealous and enterprising explorer in a country so little known as Australia. At the same time, Sir, I cannot but regret that there should be no personal friend of Mr. Eyre here to represent him on this occasion: some one who, from intimate acquaintance with him, could give utterance to the feelings with which I am sure he will be animated when apprised of the award of this Society. This much, Sir, I am sure, I may safely take upon myself to say, that Mr. Eyre will not only look upon this Medal as a high reward for his past exertions in the cause of discovery, but as a stimulus to still further efforts. I may perhaps be permitted to add, in the words of one who knows Mr. Eyre well, and has had abundant opportunities of knowing of what he is capable, ‘that there are few men upon whom expectation may more strongly rest for future exertion in the extension of geographical knowledge.’”

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- 1831.—Mr. RICHARD LANDER, for the discovery of the course of the River Niger or Quorra, and its outlet in the Gulf of Benin, in Central Africa.
- 1832.—Mr. JOHN BISCOE, for the discovery of the land now named "Enderby's Land" and "Graham's Land," in the Antarctic Ocean.
- 1833.—Captain Sir JOHN ROSS, R.N., for discovery in the Arctic Regions of America.
- 1834.—Major Sir A. BURNES, C.B., F.R.S., for the navigation of the River Indus, and a journey by Balkh and Bokhara across Central Asia.
- 1835.—Captain Sir GEORGE BACK, R.N., for the discovery of the Great Fish River, and navigating it to the sea on the Arctic Coast of America.
- 1836.—Captain ROBERT FITZROY, R.N., for the survey of the shores of Patagonia, Chile, and Peru, in South America.
- 1837.—Colonel CHESNEY, R.A., F.R.S., for the general conduct of the "Euphrates Expedition" in 1835-6, and for the accessions to comparative and physical geography relating to the countries of Northern Syria, Mesopotamia, and the Delta of Susiana.
- 1838.—Mr. THOMAS SIMPSON, [Founder's Medal,] for the discovery and tracing, in 1837 and 1838, of about 300 miles of the Arctic shores of America.
- Dr. EDWARD RÜFFELL, [Patron's Medal,] for his travels and researches in Nubia, Kordofán, Arabia, and Abyssinia.
- 1839.—Mr. R. H. SCHOMBURGK, [Patron's Medal,] for his travels and researches during the years 1835-9 in the colony of British Guayana, and in the adjacent parts of South America.
- Major H. C. RAWLINSON, E.I.C., [Founder's Medal,] for his travels and researches in Susiana and Persian Kurdistan, and for the light thrown by him on the comparative geography of Western Asia.

1840.—Lieut. RAPER, R.N., [Founder's Medal,] for the publication of his work on "Navigation and Nautical Astronomy."

——— Lieut. JOHN WOOD, I.N., [Patron's Medal,] for his survey of the Indus, and re-discovery of the source of the River Oxus.

1841.—Captain JAMES CLARK ROSS, R.N., [Founder's Medal,] for his discoveries in the Antarctic Ocean.

——— Rev. Dr. E. ROBINSON, of New York, [Patron's Medal,] for his work entitled "Biblical Researches in Palestine."

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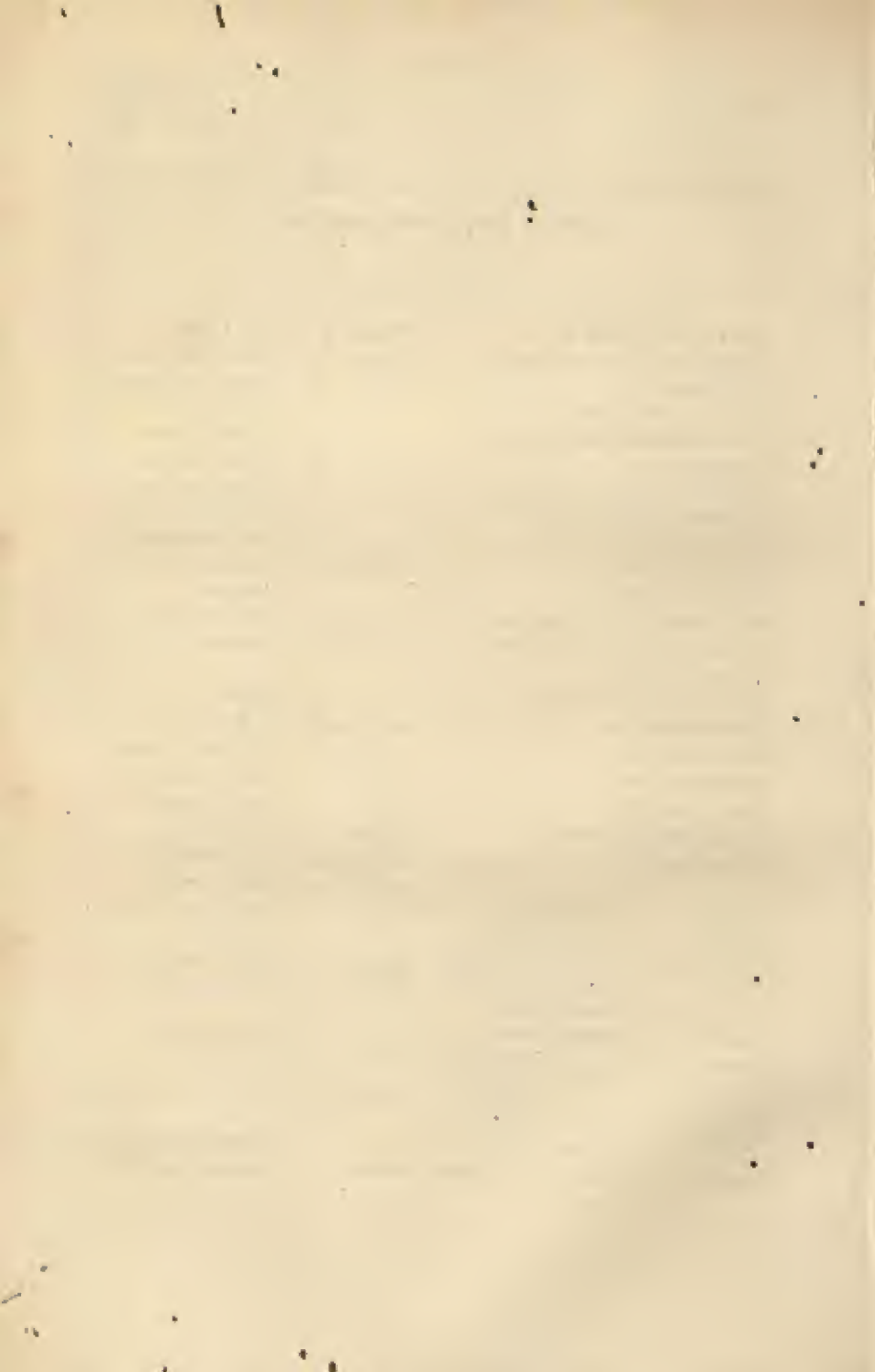
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# ADDRESS

TO THE

## ROYAL GEOGRAPHICAL SOCIETY OF LONDON;

*Delivered at the Anniversary Meeting on the 22nd May, 1843,*

BY

WILLIAM RICHARD HAMILTON, Esq., F.R.S., &c.  
PRESIDENT.

GENTLEMEN,—The Secretary having completed the reading of the Annual Report of the Council, I have much pleasure in congratulating you on the advances in geographical knowledge, which have been made during the lapse of the last year, to which advancement I am willing to believe that the Royal Geographical Society of London have contributed at least their due share.

You have just heard the grounds on which the Council have awarded the royal medals placed at their disposal by the generous bounty of Her Majesty for the current year. One of these medals, you will have observed, has been awarded in token of the sense the Council has entertained of the benefit derived to geography from the happy application of scientific acquirements to the extension of physical geography; and the other for the successful issue of one of the most daring attempts to extend our knowledge of a barren and inhospitable coast, attended with an heroic display of hardihood, perseverance, and devotion, amongst almost unparalleled circumstances of privation and distress.

It is now my painful duty to announce to you that during the last year the hand of death has deprived us of many eminent individuals, some of whom, by their labours, have greatly contributed to the advancement of geography, or to those departments of knowledge which are intimately connected with geography.

## OBITUARY.

The Royal Geographical Society has, in common with other literary and scientific societies of the kingdom, to deplore the loss of the late Duke of Sussex. His Royal Highness was Vice-Patron of the Society; and he was ever warm in his expressions of good-will towards us, and anxious for the success of all our exertions for the advancement of geographical knowledge. As a British Prince, the Duke of Sussex was ever ready to come forward in the cause of science; and for the five years or more during which he held the office of President of the Royal Society for the promotion of natural knowledge, he spared neither pains nor trouble to forward their views; and nothing could exceed the genuine warmth of heart, and generous affability, with which he received every one who had access to him, particularly if he came to plead a cause wherein the interests of science, or literature, or the fine arts, were, however remotely, concerned.

The Rev. E. T. Daniell was not a member of our Society, but such an honourable and devoted victim to the cause of geographical discovery must not pass unnoticed from this chair.

Mr. Daniell left England in September, 1840, with the intention of travelling in Greece, Egypt, Syria, and Asia Minor. To the latter country especially he looked forward as a field for fresh discovery. Gifted with the finest taste, and the eye and hand of an artist, wherever he went he brought away memorials of the greatest interest in the shape of admirable sketches. Having explored the banks of the Nile as far as the second cataract, having visited Mount Sinai, and made an extensive tour in Syria, mainly with the view of illustrating the most interesting localities mentioned in Holy Writ, he proceeded to Constantinople, where he met with Captain Graves, of H. M. S. *Beacon*, and Mr. Fellows, then about to proceed to Lycia, to procure the marbles now in the British Museum. At the invitation of the commander and officers of the *Beacon*, Mr. Daniell joined the party, and remained with them until March, 1842, making excursions from the ship to all places of antiquarian interest around Telmessus, and in the valley of the Xanthus. When the *Beacon* left Xanthus, Mr. Daniell remained behind, in company with Lieutenant Spratt and Mr. E. Forbes, with the view of thoroughly exploring the geography of Lycia. During the tour he then made, which lasted until June, when the party returned to Rhodes, the sites of seventeen ancient cities were fixed with certainty, from the combined evidence of position and inscriptions: viz., Phellus, Candyba, Cyanæ, Sura, Corydalla, Rhodiopolis, Idebessus, Acalissus, Gagæ, Lagon, Termessus Major, Lagbe, Cibyra, Buton, Balbura, Cenounda, and Arsa; besides others, which from the evidence of position alone ap-



peared to be Pyrrha, Mandropolis, Sinda, Apollonis, or perhaps Marmora, Podalia, Amelas, and Olbia. Plans of all these ruins, and an elaborate map of Lycia, the Cibyratis and their borders, were constructed by Lieutenant Spratt during this journey. In June the party repaired to Rhodes, where Mr. Daniell left his companions, and returned to Adalia with the British Consul, Mr. Purdie. After revisiting several of the former sites, in order to settle some doubts and questions regarding them, he proceeded in search of Selge, the true position of which great city he determined; and on his return rectified several important points in the geography of Pamphylia. This journey was his last, and during it commenced a series of attacks and relapses of the malignant fever of Asia Minor, ending in the death of a most amiable, accomplished, and talented traveller, at Adalia, on the 24th of September, 1842.

Sir Robert Ker Porter has been long and favourably known to the public, besides his other various accomplishments, for his *Travels in Georgia, Persia, Armenia, Babylonia, and Kurdistan*. Possessing a ready use of his pencil, Sir R. K. Porter's *Travels* are replete with interesting portraits of the people whom he saw, the countries he passed through, and the architectural and sculptured remains on the monuments he visited; and in general he obtained and deserved a character for scrupulous accuracy. He had resided for the last eight or ten years of his life at the Caracoe, in the character of Her Majesty's Agent and Consul-General in the republic of Venezuela; and having obtained leave of absence to visit his relatives in Europe, he fell a victim to the severity of the climate, when on the point of returning to England from St. Petersburg.

To Lieutenant Wellsted the Society have heretofore been indebted for some papers inserted in their *Journal*, particularly for his very full and interesting description, in 1835, of the Island of Socotra, in which, after giving us his *Journal* from the 4th January, 1834, to the 8th of March of the same year, during which he visited every part of the island, Lieutenant Wellsted enters upon many details of its natural productions and soil, its government, religion, the existing customs and manners of the inhabitants, the state of the population, the two distinct races (apparently Asiatic and African) by which it is inhabited; and his *Memoir* closed with a vocabulary of English words rendered first into Arabic, and again into that peculiar dialect of the Arabic which is spoken in the island.

Lieutenant Wellsted also communicated to us, in 1836, his observations on the coast of Arabia, between Râs Mohammed, the southern point of the peninsula of Sini, and the port and town of Jiddah in the Red Sea. The details of this journey fill up the line of the eastern shores of that gulf, which had been left unexplored by Burchhardt.

Lieutenant Wellsted has also described the ruins near Ras Bernas on the eastern coast of the gulf; and has added his reasons for thinking that they indicate the site of the ancient town of Berenice.

The late Sir William Ouseley, elder brother of Sir Gore Ouseley, was a gentleman of very considerable attainments in Oriental, and particularly in Persian literature; and the greater part of his life was devoted to the publication of works connected with the history and geography of Persia, into which country he accompanied his brother, appointed Ambassador Extraordinary to the Court of Teheran in 1811. Sir William took that opportunity to visit and describe some of the ancient remains in the neighbourhood of Ispahan and Shiraz. In 1821 Sir William Ouseley published his '*Travels in various Countries of the East*,' more particularly in Persia, in which are many curious and important geographical details, interspersed with discursive treatises on various points of the local histories and manners of that part of the Asiatic continent, on which the learned author brought to bear his deep and varied acquaintance with the peculiarities of Oriental criticism.

The Chevalier T. O. Brøndsted was, in his line, one of the remarkable men whom the learned world of Europe has lost within the last year. He was a traveller, and one who travelled with his eyes open, and who has since given to the public the result of his researches; but as these were confined to parts of the continent and islands of Greece, so were the observations of Brøndsted almost exclusively devoted to the illustration of ancient history and ancient art, and in these branches of research his services were eminently meritorious. A few years before his death he had given to himself a task which, had he lived to carry it out, would have ranked him high amongst the promoters of historical or comparative geography. It was to ascertain from existing monuments, such as medals and topes, from the ancient writers, and from recent travellers, all the details which could be obtained respecting the cities built or founded by Alexander in the course of his conquests in the East.

Mr. E. R. Friederichstahl, whom we had the pleasure of seeing in this city the year before last, on his return home to Vienna, after his botanical researches in Central America, died, at an early period of life, in March last year. In the course of his excursions among the interesting regions where Nature loves to luxuriate amongst the desolate and deserted monuments of an extinct people, Mr. Friederichstahl was, fortunate enough to have the means of taking Daguerrotype views of these most extraordinary productions of American science. We hope that some worthy inheritor of his papers will receive sufficient encouragement to give to the public the result of his labours.

Louis Claude de Saulces de Freycinet, Capitaine de Vaisseau in the Royal Navy of France, and one of the most successful of her sons in the

range of scientific navigation, and in voyages of discovery, was lost to his country in August, 1842. This distinguished officer began his career in the same path of geographical and maritime discovery in which his active life terminated. In 1800 he accompanied Captain Baudin to the South Seas, and in the course of the expedition was appointed to the command of the barque *La Camaria*, fitted out for the purpose at Port Jackson. In 1817 he undertook, in command of the *Urania*, a voyage of circumnavigation, the result of which has been to give to the world, though not yet in a complete form, a large mass of information on terrestrial magnetism, on meteorology, on natural history, and on every description of nautical phenomena. Captain Freycinet was elected a member of the Academy of Sciences in 1826, and his life has since that period been devoted to scientific investigations, more or less connected with his professional career.

The Baron Louis Costaz, Member of the French Institute, and of that of Egypt, was one of the early founders of the Geographical Society of Paris; author of memoirs on geographical subjects in the '*Courrier d'Egypte*,' the '*Annuaire d'Egypte*,' and the '*Décade Egyptienne*,' &c., such as the account of his Journey in the Desert, a Memoir on the Progress of the Sands and the Advance of the Dunes, on the Colour of the Sea, Observations on the Barabras and their language, on a new method of indicating the absolute Heights of Geographical Positions, &c.

Hensen Ernst, a Norwegian, who, on an expedition to the source of the White Nile, died at Assouan, in Upper Egypt, on the 30th January of the present year.

Count Alexander Louis Laborde, Member of the Institute of France, an oriental traveller, who died in October last, aged 68.

Professor Gesenius, of Halle, a celebrated orientalist, and a contributor to our Journal, who died on the 23rd of October, 1842, aged 57.

In addition to the above names, science has also to deplore Mr. Vaughan, Secretary to the Philosophical Society of Philadelphia, through whose kindness the Transactions of that Society and other works have been presented to us;

Professor Heeren, author of Historical Researches into the Political Intercourse and Trade of the Carthaginians, Ethiopians, and Egyptians; and

Dr. Edwards, President and one of the Founders of the Ethnological Society of Paris.

Captain Conolly, the well known author of an interesting work on Central Asia, has, we sincerely grieve to find, if reports be true, been put to death, together with Colonel Stoddart, by order of the authorities of Bochara.



M. Lefevre, a French traveller and geologist in the service of Mehemet Ali, died in Africa, from fever induced by heat and fatigue, in his exploration in the suite of the Pasha's expedition up the Nile in 1839.

Aucher Eloy, a young French traveller into Egypt, Arabia, Syria, Greece, and the islands of the Archipelago, and Persia, died at Djulfa, near Ispahan; and

Mr. Lehman, who had made a scientific journey into the Khanat of Bochara, died, on his return, at Simbirsk. His papers and collections have, however, been saved; and it is hoped they will serve the progress of science.

### PROGRESS OF GEOGRAPHY.

#### EUROPE.

*England—Maritime Surveys.*—Of the surveys under the direction of the Hydrographic Office of the Admiralty, mentioned in my address of last year, some have been completed, and others are still in progress.

1. Captain Bullock, of H. M. S. *Tartarus*, has surveyed the Medway from Rochester Bridge to the Nore, and from the Nore to Harwich.

2. Captain Washington, of H. M. S. *Blazer*, whose name will never be pronounced within the walls of the Royal Geographical Society of London without the warmest feelings of attachment, and a grateful recollection of his services to the Society, has made a complete survey of Harwich Harbour, and of a new channel into Lowestoff Roads.

3. Lieutenant Otter is continuing the survey of the late Commander Slater.

4. Commander Frazer, H. M. S. *Comet*, on the coast of Ireland, has surveyed from Carlingford to Wicklow Head; the results will soon be published.

5. Commander Wolfe, having completed the survey of the Shannon; is now engaged on that of Cork Harbour.

6. Commanders Graves and Brock, of the *Beacon* and *Magpie*, have nearly completed the survey of the Greek Islands.

7. Captain Sir E. Belcher has surveyed Hongkong, which is nearly ready for publication; as also the Canton River from Canton to Liutin.

8. Captains Kellett and Collinson, of the *Starling* and *Plover*, whose zeal and skill were conspicuous in enabling the fleet under Admiral Parker to reach Nanking, have surveyed the whole of the Chusan Archipelago and the Yang-tse-kiang.

9. Captain F. W. F. Owen, of H. M. S. *Columbia*, is in the Bay of Fundy. The many dangers in this Bay, and the unusual strength of

the tides, which rise and fall 60 feet, render it very desirable to have a skilful survey made of it, as well as of the navigable part of the river of St. John; and no doubt this enterprise will begin vigorously this spring.

10 Captains James Ross and Crozier, of the *Erebus* and *Terror*, have made another attempt to penetrate the great barrier of ice which surrounds the South Pole, and succeeded in reaching a few miles further than they did in their first season. They then returned to the Falkland Islands, to fit and prepare for another attempt. They have sent home a large series of magnetic observations. Captain Ross was to leave the Falklands late in November, and to endeavour to reach the Polar land on the opposite side to that where he had previously struck it. If he finds the means of securing his two ships in safety during the winter, he will remain there till next January; if not, he will have immediately returned to the Cape of Good Hope, and may be now on his way home.

The Hydrographic Office of the Admiralty, under Captain Beaufort, has published during the year 30 charts: viz., 5 sheets of the Coast of China, 12 sheets of the British Isles, 6 sheets of the Mediterranean, and 7 sheets of North America. All of which have been obligingly presented to our library.

Captain Francis Blackwood, whom you elected at the anniversary last year as one of the members of the Council of this Society, has since commissioned H. M. B. Fly; and, in company with Mr. C. B. Yule, of the tender *Bramble*, has sailed on a scientific expedition to the Pacific, or rather to the Australian Seas: the point to which his attention is directed in the first instance is to make a survey of Torres Straits, between New Guinea and the N.E. coast of New Holland.

*Ordnance Surveys.*—During the past year, the Ordnance survey, published on the scale of one inch to a mile, has been completed, of the remaining portions of the counties of Derby, Stafford, and Cheshire; and the surveying for the six-inch scale map has made very considerable progress in the counties of Lancashire and York, including special surveys of Liverpool, Manchester, Leeds, Prescott, Newton, Warrington, Ashton-under-Line, and Middleton. The observations made with Ramsden's zenith sector for all-determinations of astronomical latitudes, between the years 1802 and 1806, have been revised and published, together with subsequent observations made in the years 1813, 17, 18, preliminary to the publication of the triangulation connecting the several stations.

During the last year the Townland Survey of Ireland, on the scale of six inches to a mile, has been brought to a successful termination; and the counties of Kilkenny, Clare, and Waterford have been published.

Detailed plans, on the five-feet scale, of Cork, Limerick, and the other towns in the southern counties, have been completed.

Within the last year, also, a valuable series of spirit-levelling has been brought to a close. This series consists of lines extending from sea to sea, in various directions across the island, terminating on points, at which tidal observations have been carefully made.

In taking a brief view of the progress which geography is making in various parts of Europe, I shall begin with NORWAY. In 1842 the following surveys were completed.

*Surveys.*—A new combination with the Swedish triangles, executed with the theodolite.

In Norway, the base of the triangulation was measured on the Frith of Christiania. In Sweden, the triangulation is founded on a base measured on Oeland, the Swedish triangles having been formerly connected with those of Russia and Denmark. Thus the whole of the Baltic is surrounded by a coherent network of triangles.

The hydrographic surveys in the northern part of Norway, which furnished the materials for the charts of the coast commenced in 1828, were completed in 1842. During that period the whole coast from the entrance of the Frith of Throudhjem to Jacob's River, which forms the limit between Norwegian Finmark and Russian Lapland, has been entirely surveyed; and, as far as circumstances permitted, the surveys have been verified by astronomical observations.

A separate expedition has been fitted out for the purpose of exploring the shoals further out in the sea between Hammerfest and Nordcap (the North Cape): these, as also the sea opposite to East Finmark, were sounded in 1842.

The survey in detail of the largest of the Norwegian åmtar (shires), viz. Christian's åmt, was concluded in 1842, after having been in hand for several years. This åmt, which includes the districts of Hædeland, Laud, Valdres, Toten, and Gudbrandsdalen, contains about 500 geographical square miles. The scales made use of are  $\frac{1}{100,000}$ ,  $\frac{1}{125,000}$ , and  $\frac{1}{150,000}$  of the true dimensions, according to the nature of the ground, the greater or less population, and other considerations. In the north-western part of this åmt the most considerable Norwegian mountains are found. The heights of these above the sea are determined by barometrical measurements, and checked by corresponding observations in the observatory at Christiania.

The following surveys are in progress:

The sounding of the large bank which is supposed to follow the western coast of Norway, and is called Havbroen (the Sea Bridge).

The triangulation of the southern part of Norway. This is to serve



as the foundation for the detailed surveys, and is now going on in the districts of Hallingdalen, in Buskeruds amt. This triangulation is executed with the theodolite; the signals are blocks of stone.

While this triangulation is going on, the triangles are filled up with the ordinary surveying instruments. The area of Southern Norway which has been surveyed up to the present time amounts to about 1300 geographical square miles.

*Charts and Maps.*—A chart, No. 6, of the Norwegian coast from Andøe and Gisund to Kvaløe, or from  $69^{\circ} 14'$  to  $70^{\circ} 21'$  N. lat. The trigonometrical survey has been executed by Captains Due and Hagerup, of the Norwegian navy, and Lieutenant Ryning, of the infantry, and is verified by astronomical observations. The chart is constructed by Captain Vibe, of the engineers (who is also the author of the descriptions of the coast accompanying each sheet), under the superintendence of the Director of the Royal Surveys at Christiania. The survey of the northern coast of Norway has been ordered by the Department of Finance, Trade, and Customs; many of the sheets of this survey are already published, and when the collection is complete it will embrace the whole of the coast from Thronhjelm to the Russian frontier, in 10 sheets.

The following maps are also in course of preparation, and will be soon published: viz.—

1. A map of the southern part of Christian's amt (shire). It was constructed in May, 1842, by Lieutenant Gjessing, and is now in the hands of the engraver, Lieutenant Wergeland. This map is published by the Department of Finance; and is in continuation of the Norwegian amts formerly published by Captains Munthe and Ramm.

2. A general map of Norway, by Professor G. A. Munch. This map, it is said, will be engraved in Germany.

3. A general map of Norway, by Captain Roosen, is to be engraved this year at Paris.

4. The publication of a map of the Norwegian lake Miosen and its environs may be daily expected from Lieutenant Finnes' lithographic office.

5. A map of the roads of the southern part of Norway has been commenced by Captain Waligorski and Lieutenant Wergeland, of the Norwegian artillery.

6. A map of Christiania, and its environs to the extent of one square mile (Norwegian), is in progress, and will be soon published.

In the Norwegian charts the same methods are used as with us and the French. The projection is that of Mercator, the true north is parallel with the border of the chart, the variation of the magnetic needle is on the middle latitude, and the rhumb lines are laid down anywhere on the

navigable parts of the sea. The longitude is reckoned from three different meridians; viz., that of Christiania, Greenwich, and Ferroë. The arbitrary signs are the same as on our charts. With regard to the Norwegian topographical maps, it may be observed, that in the representation of mountains they do not use the method by lines or strokes, or what the French call *hachures*; but, on the contrary, they employ the mode of washing or shading in Indian ink. They say that by this method they gain much, both in time and in distinctness of expression, while it is equally elegant in its appearance.

The several maps and charts published under the direction of Professor Hausteen are to be sent to our library by the first opportunity.

*Travels.*—In the spring of 1839 a young geologist, Mr. Stuwitz, was sent by the government to Newfoundland to collect specimens for the museum of the university of Christiania, to make meteorological and magnetic observations, and to learn the method by which stockfish is dried and prepared in that island. He died last year of consumption brought on by his indefatigable labours. He has published various scientific papers. His later documents and instruments have just been brought to Christiania.

DENMARK.—In Denmark there have been published papers by Dr. Lund on the fossil and living mammalia of the Brazils, and also on the extinct and existing birds of prey of that country. Leibmann has described the botany of Mexico, and of the Pic of Orizaba, interesting for the geographical distribution of plants; and Dr. Krøyer has communicated to the Society of Sciences of Copenhagen a memoir on the geographical distribution of the Amphipodes.

The government of Denmark has published in 1842 the 4th, 5th, and 6th parts of the statistical tables of the country; and within the same period two other statistical works have appeared, one by Major Baggesen, and the other by Bergsoë. Professor Forchhammer has also continued his inquiries into the geology of Denmark, a country long considered uninteresting in a geological point of view, but which, situated as it is at the foot of the great primitive masses of Scandinavia, will probably present facts of much importance. The professor, in a discourse at the secular meeting of the Society of Sciences at Copenhagen, discussed the application of the glacial theory of Agassiz and the petridiluvian theory of Sefstrom to the phenomena of boulders, and to that of furrows and streaks in the solid rocks, and he has come to the conclusion that neither of these theories is applicable to the facts in Scandinavia. But we must not enter into details trenching more directly on the domains of geology. Mr. Steenstrup has published an interesting work on the Danish peat-bogs in the ninth volume of the

Transactions of the Scientific Society, and also separately. We may also notice the publication, during the past year, of the first part of the third volume of the historical records of Greenland, containing, among other papers, geographical notes of the middle ages respecting Greenland and the adjacent parts, by the editor: also 'Travels of the brothers Zeno,' with an introduction and notes by the late Professor J. H. Bredsdorff.

The examination of those parts of Greenland, where remains are found of the old Scandinavian colonies, was concluded in 1841: the results of the later researches are embodied in the account by Dr. Pingel in the annals of the Society for 1842 and 1843. To the antiquarian chorography of Greenland, which will form part of the concluding volume of the 'Historical Records of Greenland,' will be appended a minutely detailed map, engraved last year, of that part of the district of the colony Godthaab, which is called, *par excellence*, the "Westerbygd," or western colony. At present a similar, but larger map is in preparation, of the district of Julianhaab ("Asterbygd" of the ancients); this is founded upon the map of 1836 by Captain Graah, published in the 'Antiquitates Americanae' (republished by this Society, with Captain Graah's narrative in English), but which has since received many corrections and additions.

In 1842 was also published 'Scripta Historica Islandorum de Rebus Gestis Vet. Borealiæ,' vol. ix., x., xi.

At a meeting of the Society of Sciences Dr. Estrup communicated an inquiry on the situation of the Makarian Islands (*Insulæ Fortunatæ*) and *Elisa*.

The Society has published a general map of Denmark and Schleswig in two sheets, the corners of which are occupied by geognostic sections by Forchhammer, and a meteorologico-botanical section by Schouw. With this map the series of the Society is concluded. The surveying and publishing of maps will henceforth be under the direction of the Board of Ordnance.

The Iceland Literary Society is publishing a map of Iceland, partly founded upon new measurements; one-fourth part of which is ready, but not yet published. The maritime survey of the coasts of Denmark will be completed in the present year. The surveys ordered by the Danish government embrace the whole of Norway to the southward of Dronthjem; and all the coasts and narrow seas of Denmark Proper, Schleswig, Holstein, and Mecklenburg. The Danish Hydrographic Office published in 1842 an improved chart of the North Sea in two sheets, and a new chart of the Sound in one sheet. This is the first chart of the Sound based upon an actual trigonometrical combination of the coasts



of Denmark and Sweden. It is engraved on steel of the size of 36 decimal inches by 22.

Russia.—1. Last year, when speaking of Mr. Murchison's late explorations in Russia, I alluded to a map of the Ural. Mr. Murchison has since presented to the Society a very beautiful MS. map of the southern portion of that mountain chain, with a detailed memoir by Mr. Khanikoff. It appears that the Ural, with its lateral ridges, has nowhere a less breadth than 30 miles. The true watershed or Ural Tau varies in altitude from 1600 to 2500 feet above the level of the sea; it is perfectly continuous through eighteen degrees of latitude. The elevations of this chain in some places hardly-deserve the name of mountains, while in others they attain a height of nearly 6000 feet in rugged and imposing masses. The map of the South Ural is the reduction of many elaborate field surveys made by direction of General Paroffsky, and under the immediate superintendence of General Rakasoffsky. The memoir in explanation of the map is by Mr. Khanikoff; it is in Russian, but has been translated into English at the charge of the Society.

2. Among the deaths we have to deplore, I mentioned that of Mr. Lehman, and that his papers had been saved. We learn that they will be published. Mr. Bunge has undertaken to edit the botanical part, Mr. Helmersen the geological, and Mr. Khanikoff, the companion of Lehman, has prepared an account of the voyage in Russian, which is now in the press. These travellers visited Samarcand.

3. The travels of Pachtousoff in Novaya Zemlia in 1832-3, have just been published, in Russian, in the *Journal of the Hydrographic Department*.

*Explorations*.—1. In December, 1841, Mr. Tchichatcheff was charged by H. M. the Emperor of Russia to undertake a scientific exploration into the Eastern Altai and the Western branches of the chain of the Sayanes. The chief objects of his mission were, to discover the sources of Tchoufa, of the Tchoulichmane and of the Abachane;\* and to make a geological and orographical examination of the system of the three rivers, as also of the eastern portion of the chain of the Altai, and the adjoining parts of Chinese Mongolia.

This painful journey over countries, the greater part of which have never been visited by Europeans, occupied the whole year, and was perfectly successful. The sources of the three rivers were reached on very marshy plateaux, nearly all of them inclined towards the S., in which

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\* See Ritter's map of the Altai; it is the only one which gives some details (though more or less hypothetical) of this distant region, of which Mr. Tchichatcheff has composed an orographical and hydrographical map, very detailed, on a scale of 5 versts to an inch.

direction they terminate rather abruptly. This observation is also applicable to the southern slope of the Sayanes Mountains, which the traveller crossed twice. On ascending this chain from the N. in the neighbourhood of the sources of the Abachane, Mr. Tchichatcheff was nearly three months in crossing it; but when, after the greatest fatigue, he had reached the southern edge of the snowy and swampy table-land which composes this part of the Sayanes, it only took him half-a-day's rapid descent to leave the heights. The traveller descended the southern slope of the Sayanes by the torrent of Alache, which he followed to its confluence with the Kemtchik. Thus, to the exploration of the sources of the three rivers, which was prescribed to him, he had the satisfaction to add that of one of the principal affluents of the western source of the Jeniseï. This latter river was descended as far as Kraenojarsk, and carefully mapped, as well as the rest. The voyage terminated by the exploration of a part of the Alps of Kousnetsk, of the mountains of Salair, Ryddorsk, Zmieff, &c., and by some excursions into the Steppe of the Kirghiz. Mr. Tchichatcheff has been authorized to publish the account of this journey. The work will be accompanied by two large maps, on a scale of 5 versts to 1½ inch, geological sections, and many lithographed views. It is expected to be published in the course of the present year, under the title of '*Voyage Géologique et Orographique dans l'Altai Oriental et vers la Frontière de la Chine.*'

2. Mr. de Middendorff, whom I stated in my last year's address as appointed to travel in the North of Siberia, has commenced his journey: but having learned at Kraenojarsk that it was more difficult to reach the sea than had been anticipated, he will, probably, have to construct a boat in order to descend the Chatanga.

3. The expedition which had been sent to Khiva was forced to return, in consequence of the death of the khan to whom it had been addressed.

4. Mr. Kolenati, a young naturalist of Prague, is about to visit Persian Armenia.

*Internal Hydrography.*—The '*Bulletin de la Société de Géographie de Paris*' contains a notice of the rivers of Russia; but, as it is taken from the '*Hydrographie de l'Empire Russe*,' a copy of which was long since presented to our library by the present secretary, we shall merely notice it, in order to express a wish that a similar hydrographic tableau of our own country were published. The materials for such a work undoubtedly exist, but it is very desirable that these scattered documents were collected, and a complete treatise on the internal hydrography of the country, with a good map, were given to the public; such

a map should point out the course of every stream, showing how high the tide rises in those that are subject to its influence, how far the rivers are navigable for craft of different dimensions in different seasons; and in short every object of interest respecting them, as far as arbitrary signs, letters, and numbers can be advantageously employed; the remaining details being given in an accompanying memoir.

*Maps.*—A map of the Caucasus and of the provinces beyond, richer in names than any former one, has just been published at Berlin by Schropp.

*Ethnology.*—The Imperial Academy of Sciences at St. Petersburg has published, at its own cost, a Thibetian dictionary, with Latin and German translations, the work of Dr. Schmidt. It contains 22,000 Thibetian words, and is the only existing vocabulary of that language with translations into the European tongues.

A Russian commission has been sent to the East in order to make experiments on disinfection by means of heat, it having been found that although the means hitherto employed are effectual for the purpose, they are partially injurious to health, or destructive to the objects fumigated or steeped. The commission, after remaining some time at Constantinople, has proceeded to Alexandria.

*PRUSSIA.—Books.*—The following works have lately appeared in Prussia, viz.:—\*1. Composed in Berlin, though printed in Paris, Alex. von Humboldt's '*Asie Centrale, Recherches sur les Chaines de Montagnes et la Climatologie comparée*,' 3 vols. 8vo., with Tables and a Map. Of this work a German edition has been prepared under the superintendence of the author by Dr. Mahlman.

2. *Mineralogical and Geognostical Journey to the Ural, the Altaï, and the Caspian Sea*, by Professor Rose. Vol. II. This second part contains the journey to the Southern Ural and to the Caspian, with an account of the mountains, rocks, and minerals: thus forming the mineralogical section and personal narrative of the Asiatic journey of Humboldt, Ehrenberg, and Rose.

\*3. *Comparative Geography of Asia*, by Carl Ritter, being the Tenth Part of his *Universal Comparative Geography*. It comprises the Basins of the Tigris and Euphrates.

\*4. *Archives of Scientific Information from Russia*. Edited by A. Ermann, containing original contributions from Eichwald, Tschitchakoff, Ermann, Scholt, &c., and accompanied by geognostical maps, &c. This is the second year of its appearance.

5. *Travels in Peloponnesus*, by L. Ross.

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\* The different works marked with an asterisk are in the Library of the Society.



6. On the Connection between the Malayo-Polynesian Languages and the Indo-European. By Fr. Bopp.

\* 7. The Seat of War in Central Asia; or, Remarks to accompany the General Map of Afghanistan, the Punjab, and the Countries on the Lower Indus, with Maps and Plans, by C. Zimmermann.

\* 8. Monthly Report of the Transactions of the Geographical Society of Berlin (third and fourth years), 1842-3, with Maps and many original articles.

9. Claudii Ptolemæi Geographiæ Libri Octo, Græcè et Latine, ad Codicum Manuscriptorum fidem, edidit Dr. Fred. G. Welberg. Fascicul. IV. Librum quartum continens. Fol.

\* 10. F. G. Lüdde, Journal of Comparative Geography. Magdeburg, 1843. Second year.

\* 11. Ditto, the Science of Geography. Magdeburg. 1842.

12. Ditto, the History of Geography. Berlin.

13. Annals of Geography, Ethnography, and Statistics. 1842. Breslau.

14. Greece, with reference to its Ancient Geography. 1842. By Dr. H. Duhrik, Professor in Königsberg.

15. Contributions towards a History of the latest Reforms in the Osmanli Empire, containing the Hatti-sherif of Gulhane, the Firman of the 21st Nov., 1839, and the New Penal Code, Turkish and German. Edited, in conjunction with Namis Effendi, by Dr. Petermann. Berlin, 1842.

16. Statistical Description of the Kingdom of Norway, by G. P. Blom. With a Preface, by Carl Ritter. Leipzig. 1843. 2 vols.

17. The Second Part of the Third Volume of the original German edition of E. Robinson's Palestine was published in 1842, at Halle.

18. Hermes and Weigelt, Historical, Geographical, Statistical, and Topographical Handbook of the District of Magdeburg. Magdeburg. 1842. 4to.

*Maps of Prussia and the Provinces.*—1. A General Map of Prussia and Northern Germany, in 24 sections, on the scale of 1:1,000,000, has been published under the direction of F. B. Engelhardt, of the Statistical Bureau. Halle, Kummel. This is the third edition: the first appeared in 1820; the second in 1833; the third, now completed, was begun in 1840. The work has now attained a high degree of perfection. Every thing connected with boundaries, roads, and railways; all the old and new frontier custom-house stations; the forests, and whatever progress is made in the cultivation of the territory, even to the smallest new settlements, are entered with a completeness and accuracy found in few other maps. These improvements are systematically inserted in a copy



kept for that purpose in the Statistical Bureau, from official communications, with a view to future editions.

2. Of the Special Map of the Prussian States East of Berlin, by the same author, on the scale of one duodecimal inch to the (German) mile, and in 23 sections, the fourth, ninth, and tenth sections have appeared between 1839 and 1843. Improved editions of the earlier numbers have been published during the same time. The special maps of the Prussian State, owing to the rapid progress of improvement, the changes of property and of boundaries, the enclosure of commons, the clearing of wastes, the draining of lakes, the construction of canals, roads, and railroads, require *daily* alteration. The Statistical Bureau is the central department, to which information of all these changes is communicated from the various places, and scarcely a day passes in which intelligence of newly-erected villages, colonies, &c., is not received. It requires great attention to lay down the positions of these new places accurately, not only in the original projections on a large scale, but on the published maps, and to improve these continually. This map comprises not only Prussia East of Berlin, but the kingdom of Poland, with its present divisions, and Bohemia, to five (German) miles south of Prague, in equally minute detail.

3. The same author has published a new and improved edition of his Map of the district of Potsdam, in 4 sections.

4. The Maritime Atlas of Prussia, a splendid work, engraved on copper, on a scale of  $\frac{1}{100,000} = 2$  decimal inches, folio, is in course of publication by the ministry of Commerce since 1841. It contains—

a. The historical introduction, index map, lighthouses, and profiles of the coast, in one part.

b. Seven parts only, in 20 sheets on the scale above mentioned, have yet appeared. These comprise the shores of the Baltic for half a (German) mile inland, with all the topographical details from a special survey made by officers of the General Staff; and half a (German) mile seaward; with the soundings in fathoms to the depth of 3 fathoms (18 feet), and all shallow parts in feet.

c. Two large charts, each 2 feet 9 inches square, on the scale of  $\frac{1}{100,000}$ , or half a decimal inch to the (German) mile. They contain the coasts of the Baltic from Warnemünde to Sackenbaume, 6 (German) miles N. of Liebau, and the whole breadth of the Baltic W. of Swinemünde, through the Sound to Kullen, and E. of Kaslin to the Isle of Oeland, as also the Islands of Bornholm, Christiansoe, and the S. coast of Schonen, with many direct and cross lines of soundings. It is a splendid and costly work.

5. A Special Topographical Map of Germany, commenced by C. D.

Reymann, and continued by Colonel W. von Oesfeld, Director of the Trigonometrical Bureau of the Royal Prussian Staff, on the scale of  $\frac{1}{111,300} = 1$  decimal inch. The original editor, Reymann, contemplated 342 sections: of these, 142 have appeared. Since 1839, when Oesfeld became the editor, there have appeared sections 11, 12, 13, 28, 34, 35, 37, 43, 94, 145, 161, 163, 187, and 217; some of them new, others completely remodelled.

6. Topographical Map of the Province of Pomerania, consisting of 56 sections, the last of which have appeared during the present year. It is well lithographed, on a scale of  $\frac{1}{111,300} = 2$  decimal inches, reduced from the topographical map prepared by the officers of the Military Academy, (the result of the survey undertaken by them, at the suggestion of the General Staff,) on a scale of  $\frac{1}{111,300} = 1$  decimal inch.

7. Topographical Map of Westphalia. A very detailed survey has been made of the Rhine provinces and Westphalia, on a scale of  $\frac{1}{111,300} = 8$  decimal feet to the (German) mile, for financial purposes. These special maps, however, indicate only the character of the soil, not its inequalities. At the request of the provincial government of Westphalia, the ministry allowed copies to be made on the reduced scale of  $\frac{1}{111,300}$  to the mile, to be surveyed and laid down on these copies, by officers appointed by the Topographical Bureau, and lithographed. This is the first accurate topographical map of Westphalia which can be relied on. Nine sections of it have appeared, and the towns of Minden, Nieheim, and six others. In respect of clear and sharp lithography, and accurate topographical and orographical delineation, it far surpasses all those previously published by the General Staff of Prussia.

8. Maps of the Circles of the Provinces of Westphalia. In addition to the preceding map, maps of each circle in the province have been in course of publication since 1840, by the Counsellor of Finance, Emmerich, with the assistance of the Geographical Engineer, Schmelzer. Four circles have appeared on a scale of  $\frac{1}{111,300}$ ; they contain the hills in detail, and the ground plan of the villages.

The following important maps have also appeared:

9. Special Map of the Government of Koblenz and the Duchy of Nassau, by Mr. W. Walter. Lithographed, the hills shaded. Four sheets, on the scale of  $\frac{1}{111,300}$ .

10. Environs of Berlin, accurately laid down by the General Staff, in 14 large sections, clearly lithographed, on the scale of  $\frac{1}{111,300} = 8$  decimal inches per German mile. It extends from Berlin over Potsdam, as far as Grossenkreutz.

11. Government of Erfurt; Maps of the Circles of Erfurt, Mülhausen, Langensalza, Heiligenstadt, Worbis, Weissensee, Nordhausen

Zeigenrück, and Schleusingen. Published by Platt, in Magdeburg. Lithographed, and on the scale of  $\frac{1}{100,000}$ .

12. The Government of Erfurt in one sheet, with the circle boundaries on the scale of  $\frac{1}{100,000}$ . Magdeburg.

13. Government of Erfurt, on the scale of  $\frac{1}{100,000}$ , with accurate statistical details. Published by the house of Müller in Erfurt.

14. Special Map of the Province of Saxony, by A. Platt, on the scale of  $\frac{1}{100,000}$ , with a statistical table, corrected according to information from the local government authorities.

*General Maps.*—The most important maps on the eve of completion, or just published, are—

1. H. Kiepert, Map of Palestine; chiefly after Robinson. Published by Carl Ritter. Constructed by the author of the special maps in Robinson's work.

\* 2. H. Kiepert, Atlas of Hellas and its Colonies; 24 plates. The third part is in progress. The house of Nicolai publish it, and promise that the last 8 maps shall appear in the course of the summer.

\* 3. C. Zimmermann, Map of Western Persia and the Countries on the Tigris, 4 sheets. The continuation of his Map of Central Asia, Berlin, 1843. Khorasan, one sheet; the region between Herat and Semrûm, one sheet, connecting the map of Central Asia with that of Western Persia, appeared in 1842; sheets with Fars and Mekrân, and sheets to complete an Atlas of Hither Asia, are in progress.

\* 4. The Physical Atlas of H. Berghaus is in course of publication since 1838. This work, which has nothing equal or similar to it in any country, which renders *visible* the progress of geographical science, consists of six divisions; the ninth livraison has appeared this year. The first division, Meteorology, contains 12 sheets; the second, Hydrography, 15 sheets; the third, Geology, 9 sheets; the fourth, Magnetic Phenomena, 5 sheets; the fifth, Geography of Plants, 6 sheets; no sheets of the sixth division, Zoology and Anthropology, have yet appeared: 47 sheets have been published, and, according to the original plan, there will be thirteen more.

\* I cannot pass over the mention of this very valuable work without expressing my satisfaction that through the enlightened enterprise of Mr. A. K. Johnston, Geographer to the Queen at Edinburgh, we shall be put in possession of it in an English dress. Some of the sheets have already appeared, and will tend materially to increase the interest felt amongst us in the science of Geography.

5. A most important contribution to our knowledge of Hither Asia is on the eve of being published; the six-sheet map of the countries from the Tigris and Euphrates to the Bosphorus, compiled from the surveys



of the Prussian staff-officers, by Kiepert, on a scale of  $\frac{1:250,000}{1:250,000}$ , lithographed by Mahlmann, and to be published by Schraff. The two eastern sheets, the upper course of the Tigris and Euphrates, after the survey of Major von Moltke (author of the important letters on the condition of Turkey, and events there in the years 1835-9. Berlin, 1841, Svo.), with Turkish Armenia, according to Russian and English observations, are completely engraved and will soon appear. The two middle sheets, containing Cappadocia, Galatia, and Cilicia, from the survey of Majors von Vincke, von Fisher, and von Moltke, with routes and positions communicated by English travellers, will be published in the course of the present summer. The two western sheets (Asia Minor) contain the surveys of the Prussian travellers Schönborn, Löw, and H. Kiepert. The masterly survey of the course of the Tigris and Euphrates from Samosat, Bir, and Mosul, to the sea, will be connected with these operations.

*Cartography.*—The following publications deserve to be noticed as specimens of coloured printing, by means of several lithographic plates, viz. :—

1. E. von Sydow. Mural\* Atlas of all parts of the earth. A general sheet, the plane projection of the sphere (each hemisphere of three feet in diameter), and the four divisions of the globe on a scale of  $\frac{1:250,000}{1:250,000}$ , and Europe on a scale of  $\frac{1:500,000}{1:500,000}$ , have been published for the use of schools, 1840-3, with a short explanation of the best methods of using them.

2. The same method of coloured printing has been skilfully applied by von Sydow, on a smaller scale, in the 'Methodical Hand Atlas, for the Systematic Study of Geography.' Gotha, 1842-3. In two parts.

3. The School of Geographical Art, under the direction of H. Berghaus, in Potsdam, is making continual progress in the perfecting of its plans, maps, engraving, and printing.

4. Lithographic delineation of maps has been much improved by Deliris, Mahlmann, and the persons employed in the office of the General Staff.

5. The maps in relief, and the globes of K. W. Kummer, are in course of gradual and constant improvement. He is at present engaged on a globe four feet in diameter, with the countries in relief. He is also publishing segments of this globe, with maps of different parts of the earth in relief, and with a spherical surface, as in nature. The horizontal is to the vertical scale in the ratio of 1 : 10.

6. Lieutenant Zimmermann has constructed an index map of Central

\* This term is used by continental geographers in speaking of maps made for being suspended on the walls, for public instruction.

Asia on a new plan. The details of the mountain ranges are not given, but the normal direction of their axes and their profiles, cultivated lands, waste lands, and mountainous regions, are distinguished by colours. On this map are six hypothetical profiles of mountain ranges; all land that rises to the height of 800 or 1000 toises is distinguished by its colour. The direction of the four principal mountain ranges which cross each other are indicated, as also the extent of the deserts, their extension into the bosom of the mountain region, the limits of the cultivated regions on the edge of the mountain country and in the principal valleys. The scale is 1:1,000,000.

*Surveys.*—The state of the Prussian surveys may be gleaned in great part from what has been already said of the maps. The survey of the Prussian states of the German territory is completed in Silesia, Pomerania, the Marks (Prussian), Saxony, the Rhineland, and Westphalia. East and West Prussia have still to be surveyed by the General Staff; nothing has been done there since Von Schröter's operations, and some years will elapse before a new beginning can be made. The government, in addition to its own surveys, is in possession of a survey of the whole of Saxony, kingdom and dukedoms, by its own General Staff, and of the provinces on the left bank of the Rhine by Transhot. Improved special surveys are instituted in different parts of the kingdom; in 1842, 149 square (German geographical) miles were surveyed by the General Staff, partly in Westphalia between Ems and Rhine, partly in the Marches between the Havel and Elbe.

*Geographical Instruction.*—In reference to the great progress now making in Prussia for improving the materials of geographical instruction, I mention, with particular satisfaction, the important impulse which may be expected to the study of ancient and comparative geography, from Gustavus Kramer's new critical edition of Strabo. The groundwork of this edition is a careful investigation of all the MSS. collected by the editor in Italy and France. It has thus been rendered possible, not only to restore many original readings, and lay the foundation of a correct text, which has been hitherto a desideratum, but also to fill up in great measure the lacunæ at the end of the 7th Book by the discovery of a very complete epitome, which corresponds almost verbally with the fragments of this part of Strabo's work that have been preserved. A number of less important lacunæ are also supplied. This edition will contain everything necessary for a correct estimate of the text, with critical notes and a complete index. It will consist of four volumes, which are expected to be ready in the course of the year.

2. A no less important work is the second large folio volume, just completed in three parts, under the title '*Corpus Inscriptionum*

*Græcarum Auctoritate et impensis Academiæ Literarum Regiæ Borussicæ*, edidit Augustus Bœckhius, Acad. Soc. Berolini. Folio. Ex officina academica. Reimer. 1843. Vol. II. Fasciculus I. contains six sections: sec. 7, with inscriptions from Acarnania, Epirus, Illyrium; sec. 8, from Coreyra and the neighbouring islands; sec. 9, uncertain localities; sec. 10, from Macedonia and Thrace; sec. 11, from Sarmatia, Chersonesus Tauricus, and the Cimmerian Bosphorus; sec. 12, the islands of the Aegean Sea, with Rhodæ, Crete, and Cyprus. Fasciculus II. contains the continuation of sec. 12; sec. 13, inscriptions from Caria; sec. 14, from Lydia. Fasciculus III. contains inscriptions from Lycia, Pamphylia, and the rest of Asia Minor.

3. Rudolph von Benningsen Förder has published this year at Berlin in 4to. a Memoir with an illustrated map, entitled 'The law of numbers in rock formations in relation to the disposition of valleys, springs, running and standing waters, elevations and localities, especially in the north of France, with remarks on the relation of Geology to special Geography in orographical, hydrographical, statistical, and historical respects.' This is an important contribution to the application of geognosy to illustrate physical geography. The motto prefixed to the Essay is one of the great maxims laid down by Alexander Von Humboldt, '*La physique du globe a ses élémens numériques comme le système du monde.*'

Geographical instruction is also a part of the *curriculum* in every Prussian school, gymnasium, military academy, and university.

*Travels and Discoveries.*—1. Professor Lepsius began in the middle of 1842 a journey to the countries on the Nile, which will occupy several years, and is supported by the King, and by the Berlin Academy of Sciences. He is accompanied by architects, painters, and men of science; several independent travellers have attached themselves to his expedition, which is intended to be supplemental to that of Champollion. Antiquities, history, and geography, are its objects. A revision of the monuments, for the purpose of throwing light on the oldest civilization and history of the race, is also contemplated, in connexion with surveys, drawings, models, and excavations, collection of inscriptions explanatory of hieroglyphics and chronology. Fragments of the results of the labours of this expedition have already been received, which have enriched the field of geography. Some important papers have already appeared in the monthly report of the Geographical Society of Berlin.

2. Professor Welcker, of Bonn, has returned with rich contributions to geography, as well as other branches of knowledge, from an archæological journey of several years, in the course of which he examined the architectural and scientific monuments of Italy, Sicily, Greece, the



Archipelago, and Western Asia Minor or the Bosphorus. The journal of Welcker's friend and predecessor, Otfried Müller, of Göttingen, who died at Athens, will shortly be published at Halle by his fellow-traveller Professor A. Schöll. Müller's second associate Dr. E. Curtius, who took part in his latest explorations at Delphi, is about to publish his friend's *Delphica*.

3. The geography of Greece, as it is, has been also illustrated by the 'Communications respecting Greece' of Professor Christopher August Brandis, the critical reformer of the text of Aristotle's Philosophical Works. This publication appeared in 1842 at Leipzig in 3 vols.; the first part contains the author's personal narrative of his travels, the second a history of the War of Liberation, from Greek authorities, and the third an examination of the present condition of the kingdom of Greece.

4. H. Kiepert employed the years 1841-1842 on a journey from Constantinople to the W. coast of Asia Minor, undertaken at his own expense, for the extension of geographical knowledge. He went by Brussa, where he executed a survey of Mount Olympus, to Smyrna. He took, in company with some men of science, Schönborn and Loew, a new route over Adranas, Balat, Bahaditche, Balukhissar, Pergamo and Manisa; in the course of which he examined and mapped the lateral valleys of the Upper Rhyndacus and the Macistus. From Smyrna, Kiepert alone visited Phocæa and Cyme, examined Lesbos, with a view to make a more accurate map of the island, in the course of which he discovered the Cyclopean ruins of Eresus and another ancient town, perhaps Arisba. In the winter of 1842 he explored the Thracian Chersonesus, the Troad, the whole mountain system of Ida, with the adjacent countries, to the hitherto unexplored valleys of the Rhodius, Præctius, Granicus, and Æsepus. This tour supplied few antiquities beyond some inscriptions incorporated into the second volume of Boeckh's 'Corpus Inscript. &c.'; but the traveller was able to construct a complete and detailed map of the region. Of the islands, Imbros and Samothrace, hitherto but imperfectly known, were explored. The most interesting results next after the geognostical structure of the island, are the ruins of the old town and temple of the Cabiri in Samothrace. From the Dardanelles Kiepert returned by the least familiar routes to Adramyti and along the Æolian coast to Smyrna. From thence he visited, in company with Professor Welcker, Ephesus, Magnesia, Tralles, Tireh, and Nymphi; traversed and laid down several new routes, and made a drawing at Nymphi of the sculpture called the Monument of Sesostriis. This drawing, a map of the surrounding district, and an explanatory memoir, have been published by Kiepert in Professor Ger-

hard's *Archæological Journal* (No. III. March, 1843. Berlin: Reimer). The rest of his tour is to be published separately. His maps have been incorporated into the two western sheets of the map of Hither Asia before mentioned.

5. The journey of Professors Schönborn and Loew of Posen, although they accompanied Kiepert from Constantinople to Smyrna, was quite unconnected with his. This expedition, partly at their own cost, partly assisted by the department of education, was undertaken with a view to complete and extend the discoveries in Lycia, so happily commenced by Mr. Fellows. The most obscure parts of the geography of Caria, Lycia, Pamphylia, Pisidia, and Phrygia, have been illustrated by their researches. Loew travelled for purposes of geology and natural history, and will publish in due time his observations. The route taken by Schönborn (who was sometimes separated from his companion) was as follows:—In Pamphylia he penetrated by the valleys of the Cestrus and Eurymedon, on the one hand to Isbarta, on the other to Eghirdi and the Bey-shehr-gel. This route gives, along with the course of the rivers, a tolerable approximation to the direction of the principal mountain ranges of that region. E. of the Cestrus he found the ruins of Selge. To the N. of Karaburlu are the ruins of a second large town; a third is in the Eurymedon valley near Kesme. There are many churches and other ruins. The coast of Adalia was examined, particular attention being paid to the mountain passes by which it is reached, and the valley of the Duden. Termessus and the high plain N. of it as far as the lake of Buldur were visited. Here were found besides Olbassa the ruins of two towns near Folla and Pajamadsh (Isionda?). It appears easy, from this route, to give the direction of the mountains and the courses of the principal rivers, between the valley of the Cestrus and as far W. as Gölhisar and the sources of the Xanthus, and the connexion of this region with the adjoining districts. The high plains of Almalu were examined with especial care on account of the passes. Several ancient sites were visited, particularly in the Cibyratis, Bubon, Cibyra, Balbura, and Cenoanda. The antiquarian discoveries in the mountain region, between these sites and the Talaman Chain, were of less consequence. It was crossed in two places from N. to S.; the tributaries of the Talaman chûi explored, and the stream itself followed to the sea. Here Caunos was easily recognised; the names of some ancient sites on the road from Tabac to Cibyra could not be discovered; Trapezopolis, at the south base of the Baba Tagh, was easily recognised. The passes, with the plains of Davas and Karajik, and the watercourses of the former, were most interesting. These are all affluents

of the *Jenidré chái*, which falls into the Meander. On a tour along the western declivity of the *Solyra chain* two ancient towns, one of which was *Marmara*, were found; and W. from *Myra*, in the direction of *Antiphellus*, *Sura*, *Cyanae*, and a third town were discovered. *Irnesi*, in the *Kassaba* valley, was clearly *Arnese*, and many churches were met with. W. of *Cragus* an ancient site was sought for, but in vain. Many petrifications were found in places on the coast and the lower valley of the *Xanthus*, among the debris of the *Pamphylian* mountains, and in great masses near *Davus*. Professor *Schönborn* has promised an account of the courses of the *Pamphylian* and *Lycian* coast rivers in his programme for Easter 1843; and this will be a very important addition to the comparative geography of this interesting region. He has brought away more than a hundred inscriptions in the Greek and *Lycian* languages.

6. Dr. *Peters*, an experienced pupil of *J. Müller*, the distinguished Professor of Anatomy and Physiology in Berlin, set out for *Mozambique* in the middle of 1842, by way of *Lisbon*. He travels at the expense, and by the direction, of the King and the Academy of Sciences, to investigate the Fauna of this unknown tropical coast, and to make collections for the Berlin Museums. It is his intention also to exert himself to extend our acquaintance with the geography of the region.

7. The Journey of Captain von *Orlich* (favourably known by his historical writings) to the East Indies, to which the King contributes, although mainly with a view to military history, also promises valuable geographical contributions.

8. An expedition to *Armenia* and the *Caucasus*, to investigate the geography, ethnography, languages, and natural history of that region, is organizing under the auspices of the King and Academy of Sciences. Professor *Koch*, from *Thüringen*, the botanist, is at the head of it. He has already visited the *Caucasus*, and enriched the botanical gardens and herbariums with his collections. Among other associates, he is to be accompanied by the philologist Dr. *Rosen*, brother of the late eminent orientalist of that name, who was professor in the University College of London. They are to explore the yet unknown sources of the branch of the *Euphrates*, N. of *Erz Rüm*, the *Tchuruk*, and the upper course of the *Araxes*, on whose banks they expect to collect information respecting the language of the *Tcherkesses*, *Ossetes*, and other races.

It is unnecessary to state that the great *Mæcenas* (*Ritter's* expression) of these branches of knowledge, *Alexander von Humboldt*, takes a warm interest and active part in promoting all these geographical expeditions.



**FRANKFORT.—Books.**—The President of the Geographical Society of Frankfort, D. Bognier, has just published an interesting work on the 'Origin of Springs,' and particularly of mineral waters.

**Maps.**—\* Mr. August Ravenstein has published a new Map of the Duchy of Nassau, on the scale of  $\frac{1}{100,000}$ , the best that has hitherto appeared; of this we are promised a copy, together with the 3rd part of the catalogue of the library of the Geographical Society of Frankfort.

**Surveys.**—Professor Geesling, of Marburg, has published the results of his surveys of the Electorate of Hesse; and other surveys are in progress.

**Geographical Instruction.**—The method by drawing is gaining ground every year more and more in the schools; and relief maps have been introduced into them in the Grand Duchy of Baden as well as in Prussia.

**BAVARIA.—Books.**—An historical and geographical dictionary has been commenced by the Historical Association in Upper Bavaria.

M. de Sprunner, who has travelled along the Main with Dr. Häule, is about to publish a Handbook for travellers, founded on accurate observation, and giving many new notices, based chiefly on ancient chronicles, and other information from authentic monuments.

**Maps.**—There have been published:—

a. The Second Section of Klein's Map (scale  $\frac{1}{300,000}$ ).

b. A Map of the Ecclesiastical Jurisdictions in Bavaria, by George Mayer, on a scale of  $\frac{1}{100,000}$ .

c. Plans and Views of Salzburg, by Mayer (scale  $\frac{1}{100,000}$ ).

d. The 4th and 5th Numbers of Sprunner's Small Historical and Geographical Atlas.

e. A Panorama of Athens. Views and Plans on 19 Sheets, by Stademann and Sommer (scale  $\frac{1}{100,000}$ ).

f. A Geographical Map of the Circle of Lower Bavaria, by Kistler (scale  $\frac{1}{100,000}$ ).

g. The Section Tann, of the Topographical Atlas of Bavaria, by the Military Staff.

h. A Map of Lower Bavaria, with the Boundaries of the Judicial districts, by Schuhmacher (scale  $\frac{1}{100,000}$ ).

i. A Plan of Munich, marking the several inns, wine, beer, coffee, chocolate, and mead houses, breweries, &c. (scale  $\frac{1}{100,000}$ ).

j. The Sections Rottenburg and Wolfstein, of the Topographical Atlas of Bavaria, with a new index map to that Atlas, will appear very soon.

k. M. de Sprunner, one of the most active geographers of Bavaria, has published the 6th Continuation of his 'General Historical Atlas;' the first livraison comprises the Empire of the Visigoths in the Iberian Peninsula, in one sheet.

\* 1. An Index Map has also appeared of the Great Cadastral Survey of Bavaria, in several sheets, on each of which the progress of the survey itself, and of the various operations for which the great work has been undertaken, are distinguished by different colours. Thus, one map shows how far the triangulation has been carried on; another, the parts which have been measured; a third, the portions which have been levelled: one shows the provinces in which the estates have been classified; another, where the houses have been taxed, &c. These maps are also accompanied by a table, showing the details of the several operations as far as they have yet proceeded. The Society has been favoured with a copy of this work, kindly brought over by General Washington, Aide-de-Camp to the King of Bavaria.

2. The Emirat of Cordova, to the extinction of the Omajades. This is the first particular map of Spain under the Mahomedans, and embraces also the N. coast of Africa, as far as Constantine. Sheets 3, 4, and 5 give the Iberian peninsula from 1028 to the present time, accompanied by additional maps and plans, as of Granada, Andalusia, &c; sheet 6 gives the ecclesiastical division of the Peninsula with the convents; and 7, a general view of the possessions of the Spaniards and Portuguese in the sixteenth century.

Of the next livraison there are prepared two sheets of the Empire of the Caliphs in its greatest extension; Syria in the time of the Crusades; and two general sheets of Europe for the Scandinavian Empires down to the union of Calmar, in 1397.

*Cartography.*—a. Models for drawings connected with Topography, Statistics, or Tactics, for the use of the Bavarian army, on different scales, and embracing all objects requisite for public business, have been drawn and engraved, and are now nearly completed. This work contains 68 models or patterns for drawings, and will be published in the course of the present year. It furnishes the results of the experience acquired by the Topographical Institution during many years, and affords the best evidence of the intelligence, with which the business of that office has been conducted.

b. Some very satisfactory trials have been made on the application of Galvanoplastics to Cartography, and sets of plates for the above mentioned object will be multiplied by this process.

I beg leave also to invite your attention to an ingenious instrument called a chartometer, invented by Lieutenant Carl Theodor von Rogister. It is a ruler for ascertaining by a ready and certain method the proportional scale upon which any map or chart has been constructed. The instrument consists of a brass triangular or prismatic ruler, about a foot in length, each of whose sides is accurately divided by proportional

lines on different scales; the first side having for its starting point the subdivision of a degree of latitude into its 500,000th part, and thence proceeding upwards by proportional subdivisions to its 20,000,000th part; the other two sides having respectively for their starting points the subdivision of 5 minutes of latitude into the 50,000th part, and 1 minute of latitude into its 10,000th part; and proceeding by proportional subdivisions, the one to the 1,000,000th part of 5 minutes, and the other to the 50,000th part of 1 minute. Lieutenant von Rogister gives the following direction for using the instrument:—Lay one side of the ruler on the scale of the map, or on the graduation of latitude, in such manner that its value shall accurately correspond with one of the quantities engraved on the chartometer (e.g.,  $1^{\circ}$ ,  $5'$ , or  $1''$ , as the case may be); when, at once beginning at the end marked A, the proportional number of the scale on which the map is constructed will be visible, and read off on the ruler by taking (when the two lines do not exactly coincide) that number on the ruler which is the nearest number below the line on the scale of the map which is being measured.

The revision of the Actual Survey, made for the purpose of improving the Topographical Atlas, and the Zenith and Barometrical Measurements in the Circle of the little Palatinate, have been continued by the Etat-Major.

*Geographical Instruction.*—The 1st part of Major Aulitscheck's work on 'Elementary instruction in the principles of Geographical Projection,' for the illustration of Lectures delivered to the officers of the Topographical Office, has just been lithographed.

A new set of Regulations for the duties and service of the Topographical Office, now in course of preparation, will secure the production of geographical works, as well as the geographical instruction of young officers, the diffusion of topographical knowledge in the army being the leading object of the military staff.

Another point worthy of notice is the improvement of theodolites for astronomical purposes (such as zenith measurements), undertaken in Munich, by J. O. Erle, which gives those measurements a far greater degree of accuracy and certainty than could be attained previously with the old theodolites adapted to the double purpose of terrestrial and astronomical observations.

**SAXONY.**—The second livraison of the Saxon Atlas is now in progress of printing. We have already been favoured with the first part of this beautiful work; and the second is promised to us in the course of the summer.



\* **BELGIUM.**—*Books.*—Mr. Dally is continuing the publication of his *Elements of the History of the human race in relation to their geographical distribution at various epochs*. The same gentleman is also publishing, in 600 *livraisons*, forming 16 volumes, with 600 engravings, a new edition of the *Lettres Edifiantes et Curieuses*; being the voyages and travels of Missionaries in all parts of the world. This edition will contain, in addition to the Missionary narratives, and their Geographical, Historical, Political, Religious, Literary, Industrial, and Commercial notices, the accounts also of all the more important researches and discoveries of Missionaries since the last published edition of the *Lettres Edifiantes* from 1783 to 1819.

\* *Maps and Charts.*—A map of the frontiers of Belgium and Holland (according to the Treaty concluded between the two countries and agreed to by the European Powers) has been completed in 8 sheets, at the Geographical Establishment at Brussels.

\* The mining map to which I alluded in my last Address has now been completed at the same establishment, and, through the kindness of M. Vandermaelen, we now possess it: it is in 9 sheets, accompanied by a voluminous memoir. It has been executed by the engineers of the mining department, and is published under the direction of the chief engineer Cauchy, by order of the Minister of Public Works. It points out all the mines, mineral and metallic deposits, quarries, founderies, &c., of the country; and, in an administrative and industrial point of view, will be of great use to the government and the country generally. Mr. Vandermaelen is preparing the materials for a similar, though still more detailed map of the whole of Central Europe, including our own island. The study of this map will throw much light upon the curious subject of the relation which exists between the industry and commerce of different provinces and countries, and their natural resources.

\* *Surveys.*—The necessary surveys for the great topographical map of Belgium are still going on; those of the provinces of East and West Flanders have been executed during the past year; and the provinces of Antwerp and Brabant are now being surveyed. This is the individual enterprise of M. Vandermaelen, and carried on at his own expense. We have been favoured with four sheets of it, two more are completed, which are on their way, and others are in hand.

*Geographical Instruction.*—We are happy to hear from Belgium that geographical instruction in that country is making great progress; not only is it taught in all the colleges and schools of the country, but the exceedingly low price at which maps are delivered from the establish-

ment of our honorary member, Monsieur Vandermaelen, at Brussels, enables every one to possess them: we are assured, indeed, that there is not a village school without them.

*Expedition.*—The savants whom I mentioned in my last address as having been despatched from Belgium upon exploratory and scientific missions are still in active employment; M. Ghiesbreght making researches into the geography and natural history of Mexico, and Messrs. Linden and Funk exploring in Columbia.

Since the return of Colonel De Puyot from his exploratory voyage in Guatemala, a Belgian company has sent out a first expedition of men and materials to Vera Paz, under the direction of Mr. Simons, the engineer of public works, who, with Mr. De Ridder, constructed the first railroad in Belgium. The object of the expedition is to found a colony. The necessary men and materials are taken out in two vessels; six wooden houses, and a chapel constructed in Belgium, form part of the outfit for the intended establishment.

*HOLLAND.*—We learn (from the 'Foreign Quarterly Review') that Herr von Siebold is preparing for the press a work on some early nautical discoveries of the Dutch. Among other MSS., of which an account will be given in this work, is that describing the important voyage made in 1639 by Quast and Tasman, and in which were discovered the Bonin Islands to the E. of Japan. Every thing relating to the voyage of Tasman, whom Kreusenstern justly calls "the greatest navigator of the seventeenth century," is particularly interesting. It is said that some curious supplementary documents and plates will accompany the work.

*FRANCE.*—*Maps.*—The Prototype Geography of France by Colonel Denais, mentioned in my last year's address, is now published in one volume 8vo., accompanied by two maps illustrative of the author's system. On this subject we cannot but acknowledge the want of a systematic arrangement of the principal facts of physical geography. There are unquestionably considerable difficulties attending the accomplishment of this desirable object. The facts of the science are themselves so indefinite in their character, that a natural classification is almost impossible. This inconvenience might, however, be overcome; and indeed, although a natural classification might certainly have advantages over an artificial one, still, as the object of any kind of arrangement is to make us familiar with the facts arranged and the relation they bear to each other, that arrangement, whatever it may be, is the best which best answers the purpose for which it is designed. A systematic classification, therefore, of all the facts of physical geography might certainly be effected; but still it would be of little use to the science unless its terminology were universally adopted. If, indeed, the lan-

guage of the science were once fixed, a very great step would be made towards a complete acquaintance with the physical condition of the earth, on which all the interest of geography depends; and perhaps the time is not distant when the savants of Europe, whose scientific conclaves unite the learned of every country into one body for the inter-communion and extension of knowledge, will adopt some comprehensive principle, on which the terminology of geographical science may be fixed, and the same words may convey precisely the same ideas. The science itself is one, and for its details to be understood alike by all, its language should be one.

*Travels.*—1. From France, Monsieur De Castelnau has proceeded, under the sanction of the French government, on an exploratory journey across the continent of South America, from Rio Janeiro to Lima, whence he proposes to return by the Marañon and the interior of Guayana. This expedition was originally patronized by the late Duke of Orleans, and since his death has been adopted by the Duke of Nemours. Monsieur de Castelnau has resided some years among the red men of North America, and has published several works on the natural history of that country; he is considered fully competent to the arduous labours of an exploratory traveller.

2. The French government have sent Mr. Charles Ochoa, a young Orientalist, to visit the regions of Central Asia, between Cashmir and Cafristan. His attention is to be directed principally to the geography and ethnography of the country.

I cannot omit this opportunity, while dwelling on some of the many advances made by our neighbours, during the last year, for the promotion of geography, of calling upon you to pay the due tribute of applause to the Geographical Society of that country for the liberal manner in which they granted last year one of their silver medals to Mr. Deane, to whom this Society formerly awarded their patron's medal for his discoveries on the North Coast of America; and another of these silver medals to Mr. Schombergk, whose successful labours in Guayana, under the joint auspices of Her Majesty's Government and of the Royal Geographical Society, we had also acknowledged in the same manner.

The same Geographical Society of Paris have, within only a few days, and in the same spirit of generous and noble liberality, awarded their large gold honorary medal for this year to our own Captain James Ross, for his valuable discoveries in the Arctic and Antarctic Regions.

PORTUGAL.—The Royal Academy of Sciences at Lisbon has published, in the 7th volume of '*Collecção de Noticias para a Historia e Geographia das Nações Ultramarinas, &c.*' the Journal of the voyage, and detail of the operations of the astronomers and geographers, com-



missioned to determine the limits of the Portuguese and Spanish possessions in South America, according to the treaty of the 13th of January, 1750. In this journal will be found many geographical positions astronomically determined.

The Academy has also commenced the publication of a MS. work on the Molucca Islands, written in the sixteenth century under the title 'Informação das cousas de Maluco dada ao Senhor D. Constantino de Bragança, em que se tratão algumas novidades da naturera, e succintamente de seo descobriment pelos Portugueses e Castelhanos, &c.'

ITALY.—*Tuscany and Papal States*.—Signior Francesco Marmocchi is on the point of publishing a complete course of geography and cosmography, accompanied with geographical maps. Attilio Zuccagni is also preparing a chorography of Italy, with tables and map; and we may expect soon to receive the completion of the geographical, historical, and statistical Dictionary of the Grand Duchy, compiled by Emanuel Repetti. The city of Florence and its environs have been mapped by the engineer Cantozzi; and Gamba of Leghorn has engraved a map of Italy, executed by Balbi. A complete collection of voyages by the most celebrated navigators is also in the course of publication in the former of those cities.

The Austrian engineers are at this moment on the point of completing the triangulation of the Papal States; and they are connecting it with that of Tuscany by the Padre Inghirami, which will at the same time be rectified, and also with that of the Grand Duchy of Lucca, by the late Carlo Brioschi, with that of the two Sicilies, by Visconti, and with that of Upper Italy, which has already been executed by French, Italian, and Austrian engineers. In the course of the summer the engineers now occupied upon this work will return to the bureau at Vienna, to proceed to the calculation of the geographical positions of their geometrical points, for the construction of the great map of the whole of Italy above mentioned.

*Naples*.—The triangulation carried on by the Institute of military geography of Vienna, for the construction of the great chorographical map of Italy, is proceeding: circumstances occurred to delay it during the last year, and it has only of late been continued along the parallel of Naples; the portion between Naples and Fusano, on the Adriatic, is completed. What still remains to be executed, is the part between Naples and the island of Ponza, the western extremity of the parallel, which will be executed in the course of the present year. The triangulation of the third order has been carried on during the year 1842, along the frontier of the Abbruzzi.

The topography of the kingdom of Naples, on the scale of  $\frac{1}{250,000}$ , has

been continued for the space between Sora, Gaeta, and Venafrò. The topographical plan of the Faro of Messina, on the scale of  $\frac{1}{100,000}$ , is completed; and in the course of the present year the coasts adjoining to the Faro will be sounded; but the soundings already indicated in the beautiful chart of Sicily in 31 sheets, by Capt. W. H. Smyth, of our own naval service, will be retained for the mid-channel through the Faro. The publication of this plan is not yet decided on, nor the scale on which it is to be engraved.

Twelve sheets of the topographical map of the environs of Naples, on the scale of  $\frac{1}{100,000}$ , are already engraved and published; three more sheets will complete the work. That of the kingdom, on the scale of  $\frac{1}{1,000,000}$ , is in hand, and three of the sheets are being engraved: the only sheet already published is that containing the city of Naples itself.

A map of the whole kingdom of the two Sicilies has been undertaken in four sheets, on the scale of  $\frac{1}{1,000,000}$ , for the use of the different public offices: this is reduced from the great topographical operations, on the scale of  $\frac{1}{100,000}$ , and is corrected by the triangulations.

*Hydrography.*—M. de la Roquette has published a detailed account of the hydrographic labours of the kingdom of Naples for the last fifty years. By this document, highly interesting in an historical point of view, it will be seen what eminent services have been rendered to the science by the indefatigable and able exertions of Colonel Visconti, one of our honorary members.

**SARDINIA.**—Having omitted in my address of last year to make any mention of the topographical labours of the Etat-Major of the army of his Sardinian majesty, I am happy to have it in my power on the present occasion to state to you that for the last two or three years the topographical bureau of the Etat-Major at Turin has been in possession of all the materials, collected during the requisite triangulations, for the construction of an atlas composed of 94 sheets, each 7 decimetres wide and 5 high, and forming together the topographical picture of the continental states of the kingdom on a scale of  $\frac{1}{100,000}$ . And in 1840 a reduction of this atlas was commenced to one-fifth, i. e. a scale of  $\frac{1}{500,000}$ , in six sheets. In 1841 one of these sheets was published accompanied by a pamphlet, entitled 'Notices on the Construction of a Topographical Map of the Continental States of his Sardinian Majesty.' Two other sheets have been published since; and a further reduced map of that in six sheets has been published in a single sheet on a scale of  $\frac{1}{1,000,000}$ .

**GREECE.**—My predecessor, Mr. Greenough, in his last anniversary address, called your attention to the neglect, which Greece had experienced on the part of our map-makers, and complained justly that, although that country had been partitioned into thirty governments, the names

and boundaries of these had not yet found a place upon any of our own maps. Since then the desideratum has been in part supplied by Mr. Johnston of Edinburgh, in a map of Greece and the Ionian Islands lately published by him; though it would almost seem as if this country, though long since said to be the seat of an independent kingdom, is still to be regarded by its western neighbours as a province of the Ottoman empire, and allowed by them to partake of the barbarous ignorance of its former masters: as if, too, the very circumstance of the intense interest felt in the events of its ancient history, and in the details of its ancient geography, was a sufficient compensation for the state of the most profound ignorance in which we are allowed to remain with regard to its present existence.

#### ASIA.

ASIA MINOR.—Amongst the geographical publications of last year there is one, to the fate and character of which I cannot plead the indifference of a cosmopolite: I mean Mr. W. I. Hamilton's *Journal of a Tour in Asia Minor during the years 1836-7*. I am assured by no incompetent judges that this traveller has substituted a faithful delineation of the physical and superficial structure of a large region of Central Asia Minor and of part of the northern coast of that peninsula, for many very erroneous impressions which had previously prevailed respecting that country: that he has examined and described geologically the nature and formation of its rocks and soils; that he has collected many ancient inscriptions, by whose help, and from other materials, he has fixed the sites of cities hitherto unknown, and explained military and other operations which were unintelligible before; that he has done his best to tread in the steps of Colonel Leake towards completing the positive and comparative geography of the region, and that he has set a good example to future travellers, in preparing himself beforehand for what he was to undertake, in the accuracy with which he noted down his day's journey, in the careful manner in which it has been prepared for the public eye, and in the construction of a map confined to ascertained positions, and to verified characteristics of the country.

*Lycia*.—Mr. Fellows's travels in Lycia and the surrounding hilly regions, with the discoveries of the sites of Xanthus, Tlos, Pinara, and other towns on that and the adjoining coast, are too well known to the public, to render it necessary for me to enlarge upon them on this occasion. We may expect that the general curiosity excited in Europe by these discoveries of Mr. Fellows will soon lead to a thorough investigation of the whole range of coast, comprising Caria, Lycia, Pamphylia,



and the two Cilicias, once the most flourishing region of Lesser Asia, and which has been for many years, for the whole extent between the range of Taurus and the coast, equally neglected by the government to which it belongs, and, till a very recent period, by the European traveller.

A further knowledge of this interesting portion of Western Asia has been imparted to us by the 'Narrative of a Survey of Parts of the South Coast of Asia Minor, and of a Tour into the Interior of Lycia in 1840-1,' by Mr. Richard Hoskyn of H.M.S. *Beacon*, acting under the direction of Commander Thomas Graves. This paper, which is published in the last number of our Journal, is followed by a short memoir by Colonel Leake on some parts of the comparative geography contained in it, and a brief explanation of the Greek inscriptions collected by Mr. Hoskyn and his companion Mr. Forbes, during their journey through Lycia between Macri, the ancient Telmessus, the mouth of the Xanthus river, Almalı in the Cibyratis, and the elevated plains of Cabalia.

I have also to call your particular attention to the publication by Mr. Ainsworth of his 'Travels and Researches in Asia Minor, Mesopotamia, Chaldaea, and Armenia.'

We have been assured likewise that Mr. Eugene Boré has successfully explored the sources of the three principal rivers in the N. and W. of Asia Minor, the Halys, the Lycus, and the Iris. We shall hail with much pleasure the details of this exploration, as soon as they shall be made known.

SYRIA.—In presenting the Patron's Medal awarded by the Council to Lieut. Symonds for his triangulation over a part of Palestine and the final settlement of the long-disputed point on the comparative levels of the Mediterranean, the Dead Sea, and the Lake of Tiberias, the former of these last being 1312·2 feet, and the latter in the Lake of Tiberias 328·1 feet below the Mediterranean, it cannot have escaped your notice that there still remains to be executed in this part of the globe a very important and interesting operation, to account for the very great discrepancy of these figures: for it follows from these two ascertained levels that there is a difference of nearly 1000 feet between the Lake of Tiberias and the Dead Sea, a distance in direct line of little more than one degree of latitude, which implies (the Jordan not being a meandering stream) a fall of more than 16 feet in every mile of its course. This is in itself a very remarkable phenomenon, and calls for the early attention of travellers and geographers. The river has been frequently crossed, and is always noted as a rapid stream, but no cataracts or decided *rapids* as such have been observed, and no one has traced its banks from one of these points to the other. It is earnestly to be hoped that the attention

of our engineer officers, if there are any still in Syria, will be directed to this remarkable circumstance; and the present generation having done so much (within, I may say, the last ten years) for the elucidation of the topography of the Holy Land and its adjacent districts, particularly in the southern portion of the basin of El Ghor, we must not allow this desideratum to be overlooked.

The Society has already been informed of the departure of Mr. Badger on a mission to the Nestorians, and that he had taken the route by Samsún and Mosul. We have not since heard from him, but we hope that his sojourn amidst the mountains of Kurdistan will make us better acquainted with the geographical features of a country, whose inhabitants, their manners, and history were so favourably described in Dr. Asahel Grant's *Sketches of a Journey performed in 1835*. For it must be remembered that the character in which Dr. Grant travelled, namely, that of a missionary physician, whilst it secured to him a kind reception from the mountains, precluded him, as he tells us, from engaging in any minute examination of the topography of the district.

PERSIA.—In the southern part of Persia an interesting journey has been performed by the Baron Clement Augustus de Bode. He took the route from Kazerún to Bebehán; and from thence, leaving on his left the road followed by M'Donald Kinneir, he went over new ground in a N.W. direction along the foot of the Zagros mountains. At Tenghi Soulek he found some interesting sculptures, of which he has made accurate drawings, and of which, together with the details of his route, he has communicated a description to the Society. After leaving Tenghi Soulek, the Baron crossed the head waters of the Kurdistan and its northern tributaries, and proceeded by Manjanik and Kale Tul to the plain of Mal Amir, remarkable for its mounds and the sculptured caves on its confines, and where he thinks he has discovered the site of the Uxian city besieged by Alexander. Finding it impossible to prosecute his journey over the mountains to Ispahan by reason of the passes being blocked up with snow, he turned eastward, and traversing a hilly country and crossing the southern tributaries of the Kuru, arrived by Béstavend at Shuster. By this route, which may be regarded as complementary to those taken along the S.W. slope of Zagros by Rawlinson and Kinneir, we are now well acquainted with the character of that part of the country, and with its interesting remains of Sassanian edifices.

*Belúchistan*.—Since the publication of Mr. Masson's three volumes on Belúchistan, &c., a fourth has appeared containing a narrative of his journey to Khalát during the late campaigns W. of the Indus. His notices of that country are calculated to complete the picture of it found

in the former part of the work; and it is accompanied with a map, which, however imperfect, enables the reader to follow the author's route. A memoir on Eastern Afghanistan is also appended, in which is a classified memoir of the geographical, mineralogical, archæological, statistical, and physical information collected in the country by Mr. Masson. It is not necessary to advert to the spirit in which a part of this work is composed, nor to the controversy in which it bears a part; but there can be no doubt that when these animosities shall have passed away, Mr. Masson's publications will take a very respectable rank amongst those, which have aided by ocular testimony to extend our acquaintance with that important range of country immediately west of the Indus.

SINDE.—Although Major Outram's rough notes of the campaign in Sind and Afghanistan in 1838-9 have been some time before the public, I cannot refrain from calling your especial attention, as geographers, to the detailed narrative of that distinguished officer's dangerous and critical journey from Khalât to Sommeanee Bunder on the coast of Belûchistan, with General Willschire's dispatches announcing the capture of Khalât in November, 1839. This expedition, which was undertaken for the purpose of ascertaining the practicability or otherwise of the route for the passage of troops, was accomplished under no ordinary circumstances of danger and difficulty; and with the result that the country would present no serious obstacles for the purpose in question, except the crossing of the Pooralla Pass, about 130 miles before it reaches the sea, where Major Outram mentions several places which would barely admit of one laden animal to pass at a time, and incapable of being improved.

The late glorious events in this part of Hindostan, in securing to us the possession of the mouths and lower course of the Indus, cannot fail to lay open a most important portion of this part of the world to geographical inquiry.

AFGHANISTAN.—The name of Rawlinson is so honourably mixed up with geographical researches in this part of the world, that I must not omit referring to a letter which your Foreign Secretary has received from that accomplished officer, dated from the Khîber Pass in November last, as an earnest that the critical nature of the diplomatic and military duties in which he has been engaged during the last three years, amidst the stirring scenes of Afghanistan, have not entirely called off his attention from the comparative geography of a country which has ever excited great interest in Europe since the conquests of Alexander. We may expect to receive from Major Rawlinson, on his return from India, very ample details on the interior of Ariana generally. In the



mean time his learned correspondent has permitted me to state that amongst the many sites of ancient cities which he has been able to substantiate, the ruins of *Cufshân*, about 10 miles from the mouth of the vale of *Ghortand*, mark the site of *Capisa*, capital of the territory named *Capisene* by the Greeks. *Upigan*, at the entrance of the same valley, named *Heup'hi-nga* by the Chinese travellers of the fourth century, is doubtless the *Opiane* of Ptolemy and *Stephanus Byzantinus*, or rather the site of *Alexandria ad Caucasum*, called *Alexandria in Opiana* by the latter. *Jelât-â-bâd*, now so well known to Englishmen for its glorious defence, has replaced the *Hiadâ Nagara*, Chinese *Nă-k'ye*, and the *Dionysiopolis* of the Greeks. *Péshâwer*, formerly *Pershâwer*, the Chinese *Palusha-polo*, is the Sanskrit *Panesha-pura*. The ruins called old *Kandahâr* are probably remains of the *Arachosian Demetrias*, as the natives of the place still ascribe them to a *Feringé* king called *Dhamarned*. The *Arachosian Alexandria* was at *Panj-wâj*, 18 miles S.W. of the modern *Kandahâr*: but the ancient capital *Arachotis*, or *Chorochoad*, as it is named by *Isidore*, was at *Khûl* in  $32^{\circ} 37'$  N. lat. and  $67^{\circ} 17'$  E. long. near *Uldn Robât*. This city was also called *Cophen*, and is the *Kî-pin* of the Chinese. On crossing the Persian frontier, Major *Rawlinson* found that the ruins of *Zarang* or *Dharang*, the capital of *Draugiana*, are now probably submerged in the *Lake Zarrâh*; but the remains of *Shehsîstan*, the *Sâsânî* capital of *Sêstdn*, still exist, and are an inexhaustible mine of ancient coins.

The late campaigns of the British armies in Afghanistan, where a few months ago we had only to lament over a series of disasters, and to apprehend more, will have opened a very large field of geographical research; and we may expect that the next twelve months will supply us with abundant information on the great extent of country partly watered by the *Helmund*, and bounded to the N. and S. by the *Hezarah* mountains and the coast of *Belûchiستان*.

CASHMIR.—I had scarcely an opportunity of mentioning to you last year the appearance of Mr. *Vigne's* second book of *Travels in Central Asia*, embracing *Cashmir*, *Ladak*, and *Iskardo*. Mr. *Vigne*, in his former publication, gave us the result of a residence in *Cabool*; and in these volumes we are agreeably led through a great variety of mountain passes in and out of *Cashmir*; of which passes Mr. *Vigne* describes, from personal observation or from inquiries he had made, no less than twenty; and others from *Cashmir* into the lower and middle *Thibets*. Mr. *Vigne* has supplied us with a large body of information respecting the manners, the religion, and the history of the *Hindoos*, *Moslem*, and *Bouddhists*, in the elevated districts; and he enters into more detail than is yet elsewhere to be found, on the upper or mountain courses of the

Indus, first between Ladak and Musjed, some distance below Iskardo: and again, when from Akko, at its junction with the Astor, he beheld, at an elevation of 9000 feet, this the noblest river of Hindostan, emerging, as he says, through a great portal, round the western extremities of Cashmir, from the thralldom which controls its course through the Cordilleras of the Himalayas. Mr. Vigne had the good fortune to meet the Baron Hügel in Cashmir; and what he says of that distinguished traveller, in whose company he afterwards occasionally journeyed, only make us the more anxious for the publication of his explorations in what have been called by some the *primaeval* regions of the world.

When, after a term of three years, spent in travelling over this region, the seat of so much history, so much conquest, so much religious mystery, and where the productions of nature are seen and studied in such variety and vigour, where the hills are the highest mountains of the earth, and the mountain torrents already broad and magnificent rivers, as Mr. Vigne was descending the lower Indus, on his return home, he was well entitled to record the pleasure he felt in calling to mind that he had crossed all the rivers of the Punjab high up in their mountain channels; that he had forded the Shy-yok, or most northern branch of the Upper Indus, at Mebra-killä; that he was the first European who had been ferried across the same stream (after its junction with the Ladak, or western branch) at Iskardo, the capital of little Thibet; that he had crossed the Ravi at Chumba, and the Chumab in Kishtawar, between Ram Hur, the southern promontory of Cashmir, and the barren plains of Thibet; and that, during repeated visits to Cashmir, he had visited Gunga Bul, the most holy of its lakes, and had slaked his thirst at the source of the Hydaspes.

*Ozome de Korös.*—In dwelling upon the more recent exploratory travels or researches in Central Asia, I cannot omit tendering a few words of regret and respect to the memory of an European traveller whose name and pursuits are little known in this country, but who was a very remarkable man in the society which he frequented in the East. *Ozome de Korös*, a native of Hungary, after having made himself master, besides various modern languages, of the different dialects of the Slavonic, was at an early period of life seized with an ardent desire to ascertain by personal research the original seat of the ancestors of the modern Hungarians; and, from some resemblances of language, he was convinced that this country would be found in that part of Central Asia which is situated between Thibet and Bootan, and somewhere N.E. of Hlassa, on the upper course of the Bourampouter, towards the Snowy Mountains, forming the N.W. frontier of China. For this purpose, and in order that he might make himself perfect master of the Thibet

language, did Czome de Korös, according to the account of him published some time ago by Professor H. Wilson, pass between ten and twelve years of his wandering life, chiefly in the monastery of Zamskar in Caman, or at Ladak, far from all the enjoyments of social or physical existence, but earnestly bent on attaining the one object of his ambition: no bed but the bare ground, no fire in the severest cold; but he succeeded in collecting and arranging forty thousand words of the Thibet language, and in compiling a grammar and dictionary of the same. This extraordinary character, who is described as having denied himself everything beyond what is necessary to the support of a bare existence, seems to have expended all he had to dispose of in the collection of books in the language to which he was thus devoted; he lived entirely on tea and plain rice, and it was rarely he was ever seen out of his room; he never changed his dress, and all he was thought to own beyond what was on his person were a few shirts, a copper kettle, books, and a writing apparatus. He was not, however, without money; and he left 5000 rupees to the Asiatic Society at Calcutta, to be expended on some literary object. A few days before his death, Czome de Korös, being then at Darjiling, in the kingdom of Sikkem, a small independent territory, under British protection, between Nepal and Boutan, had made arrangements for penetrating to Hlassa, on the Bourampouter. This city being the capital of Eastern Thibet, and the residence of the Llama, he expected to discover in its chronicles the origin of the Hungarians, which he had failed to do in the less important situations of Kaman and Ladak. Mr. Campbell, the British resident at Darjiling, rendered to this worthy and indefatigable traveller every assistance in his power, and had just succeeded in putting him in communication with the Wakil of Gulpo, or king of Sikkem, for the purpose of facilitating his journey; but the hand of death was upon him; already wasted to a skeleton, he was attacked by the fever of the country, and he died on the 11th of April, without a struggle or a groan.

I have much pleasure in referring, for many very interesting particulars in the life and travels of this singular character, to the autobiographic sketch in the first volume of the *Journal of the Royal Asiatic Society*, an article by Professor Wilson in the *Calcutta Gazette*, and to two notices in Nos. 227 and 228 of the Austrian "*Beobachter*" of August last.

**CENTRAL ASIA.**—The most prominent work on geography which has appeared during the last year is beyond doubt the '*Asie Centrale*' of Baron Alexander von Humboldt. You will find a brief analysis of it in the last volume of our *Journal*. But I would particularly call the attention of the working geographer, whose object is to collect all the



best authorities to which he can have access, and to present, upon the most logical principles, the result of many apparently contradictory accounts, so as to form one connected whole upon an obscure part of his science, to him I would earnestly recommend the careful study of that chapter of this admirable work (vol. ii. p. 365) entitled '*Système des Montagnes du Bolor.*' He will there see how beautifully the patriarch of our science has developed the characteristic features of that very remarkable range of mountains, the Imaus of the ancients, which forms the meridian axis of Central Asia; how, in the first place, it is in itself only one link of a long series of elevated ranges running, as it were, from S. to N., which, with axes parallel to each other, but alternating in their localities, extend from Cape Comorin to the Icy Sea, between the 64th and 75th degrees of longitude, and keeping an average or mean direction of S.S.E. and N.N.W. To this system, our author observes, of meridian slopes, or breaks, belong the Ghauts, the chain of Soliman, the Paralasa, the Bolor, and the Oural. It is remarkable that in this alternating arrangement of heights unconnected with each other, no one of these meridian chains is directly to the E. or W. of another; each new elevation in the series only commencing in the latitude in which the other has ceased to exist; and it is exactly in this part of the series, namely, in the Bolor chain, that we come upon that very remarkable event in the orographic and hygrometric configuration of the Asiatic continent, which consists in the intersection of this N. and S. line of mountains by that other great line of mountains running nearly E. and W. between the 35th and 36th degrees of latitude, which was known in ancient times by the name of the Diaphragm of Dicæarchus, and which extends through the whole of this division of the globe, from the Chinese province of Houpé, south of the Gulf of Petcheli, along the line of the Kouenlun (not, as generally has been supposed, along the Himalaya) to the Elburz in Mazanderan, and to the termination of the Taurus in the S.W. angle of Asia Minor.

This *Bolor chain*, Baron Humboldt observes, has for ages, with but one or two exceptions, been the boundary between the empires of China and Turkestan: various etymologies have been assigned to its name; but the most in accordance with the genius of the neighbouring people is that which considers it a corruption from Vaidurya, the Sanskrit for '*Lapis lazuli*;' the V being changed into B, and the dental D into L. The culminating points of the Bolor are about 3000 toises above the sea level; but where it intersects other chains parallel to the equator, such as the Thian Chan, or the Celestial Mountains, the Kouenlun, and the Himalaya, the elevation is greater. It is crossed on three principal points, but that by the Lake of Sirikol, or the Victoria Lake, the

source of the Oxus, as discovered and described by Lieutenant Wood, at the height of 2444 toises, is the most frequented. This was in early times the great commercial route between the E. and W. of the continent, when the Oxus was the highway of nations, and gave an easy access to the great Aralo-Caspian basin. The chief authorities from which our author takes his data are the two Bouddhist travellers, Song-zun (519 A.D.) and Hivan-thsang (630 A.D.), whose narratives have lately been translated from the Chinese, and commented upon, by Mr. Stanislas Julien; Marco Polo's narrative, though it is doubtful whether he ever crossed this range of mountains; and the four of our countrymen to whom we owe most of our real knowledge of this part of the world—namely, Elphinstone, Burnes, Wood, and Lord. Mr. Vigne's last publication is also frequently quoted by the Baron in his description of the positions on the upper course of the Indus, in the two Thibets, and in Cashmir.

It may be noted also that Humboldt, in his map which accompanies this work, in which, be it observed, he is wisely cautious in avoiding details where little is certain, identifies the Dzang-ho river with the Bourampouter; contrary to the opinion of Julius von Klaproth, who supposed it to be the upper course of the Irawaddy.

CHINA.—The late events in China have given rise to many publications, of various character and merit; but few as yet of much interest in a geographical point of view. We may, however, look forward, within no long period of time, to the acquisition of much new and valuable information respecting the geography of this great empire, as the necessary consequence of the improved terms of amity and commercial intercourse between this government and that of China. At any rate, we must soon become intimately acquainted with the whole of the sea-coast, that of the neighbouring islands included: and the possession ceded to us of the island of Hongkong will, it is to be hoped, lead to the establishment of an observatory, on the same liberal principles as those which have been in action in other parts of the world. No situation can be better adapted to such an institution, connecting as it does a great extent of coast, with many of the best harbours and largest navigable rivers within its reach, and in the midst of seas swarming with our own traders, and ships of the other commercial nations of Europe. Here, too, the advantages of the situation, and the growing importance of our commercial and political interests with that large portion, I may say, of the world, which the late success of our arms has opened to us, will probably induce the government to establish a seminary for the instruction of some of our young countrymen in the Chinese language; a task not, I believe, difficult in itself, though made to appear

so by its total want of analogy with the dialects of Europe. If this object should be attained, amongst other good results from such an acquisition to the sources of information already at our disposal, we may confidently look forward to the possession of a knowledge of the interior of China, its literature, sciences, and arts—the last probably the most valuable of the three—equal to that which we now have of other long known portions of the globe: and, as geographers, we shall hail this accession with the greater pleasure, as till now access to the interior of China has ever, with the rare exception of the Jesuit missionaries, been as a sealed book to the European traveller.

*Chinese Language.*—It is observed by the distinguished philosopher and traveller to whom I have referred, that the study of the Chinese language was of course at first limited to its structure, and the nature of the signs which served to express ideas and sounds; then to the absence of grammatical inflections, and of those organic analogies common to other idioms; the influence which such a language must necessarily exercise on the development of the intelligence of those who speak it, and the obstacles it may or may not present to the progress of civilization. When we have at length attained to a sufficient analytical knowledge of the language to interpret what is written in it, we seek to know its literary productions, in poetry, in history, and in philosophy. But it is only of late years that the western world has come to a knowledge of the fact that Chinese literature is rich in the most valuable records of geographical knowledge, mixed up, it is true, with their historical notices, but containing ample details of geographical and statistical descriptions of extensive provinces, indications of different climates and modes of cultivation, discussions on the vicinity and direction of mountain chains, on the distribution of perpetual snow, and on the extent of the hydraulic systems, or river basins of Nature. These Chinese compilers were wont also to record an exact register of natural events; they watched nature in the exhibition of her mechanical powers, and in her ordinary productions; and they described the inequalities of the soil, earthquakes, and the fall of aerolites. This extraordinary people were mainly aided in enriching their literature with these expanded geographical views by the three circumstances enumerated by Humboldt: namely, their warlike expeditions against the nations of the West, joined to the peaceful conquests of the Bouddhist pilgrims; secondly, the religious interest attached to the mountains, occasioned by the necessity of sacrifices; and, thirdly, their early use of and familiarity with the qualities of the needle. Whilst the two former of these advantages pointed their particular attention to the great mountain ranges of Central Asia, the last, dating, it is supposed, twelve centuries before our era, gave to the



ographical and hydraulic descriptions of the Chinese a very decided superiority over those which we find, rare, indeed, and scattered as they are, in the writers of Greece and Rome.

INDIA.—*Surveys.*—The measurement of the grand meridional arc in India, which was commenced about twenty years ago by Colonel Lambton, by order of the Court of Directors of the East India Company, was completed, in the course of last year, by Lieut.-Colonel Everest, as far as the astronomical and trigonometrical operations are concerned. That officer is now occupied in the computations necessary to bring out the results. The entire arc extends from Cape Comorin to the Himalaya Mountains. The officers who assisted in this work have been formed into separate parties, and are engaged in measuring subordinate meridians branching from the grand one, in order to extend the triangulation over the whole peninsula. The survey of the district of Salem was sent home during the past year; this, with a small exception, completes the survey of the whole of the Madras Presidency. The survey of the Nizam's territory proceeds steadily. That of the Nandair Circar, which has been lately received at the India House, will enable the Court of Directors to publish the fifty-sixth sheet of the Indian Atlas during the present year. Several other sheets are in the hands of the engraver.

In the marine department, two sheets of the principal harbours and anchorages in the Red Sea, from the surveys of Captain Moresby, Elwan, Haines, &c., have lately been published. The survey of the sea face of the Sunderbunds, showing all the entrances of the rivers and channels, at the head of the Bay of Bengal, and the survey of the sands and channels extending from the Hoogly to False Point, by Commander R. Lloyd, I. N., were published during the autumn of last year, as well as a new edition of Captain Ross's chart of the coast of Arracan, Cheduba, &c., with considerable additions from the surveys of Commander R. Lloyd, I. N., and Commander E. P. Halsted, R. N. A survey of the coast of Africa, from the Strait of Babelmandeb, round by Tajurrah, Bay of Barburra, by Lieutenant Barker, I. N., and of Soomseeany Bay, by Lieutenant Montiron, I. N., are being engraved. Lieutenant Roberts, I. N., has lately executed an interesting survey of the Yan-tze-kiang, from its mouth to Nankin. The surveys of the Gulf of Mansar and adjacent coast of India are going on under Mr. Franklin.

BOMBAY.—We have been informed by the Secretary of the Bombay branch of the Royal Geographical Society, Mr. Buist, that they are active, and that if we have not received their Journals it is not from any want of attention on their part, nor from want of exertion of the members. They have abundance of valuable papers, but the difficulty

of getting them properly printed in Bombay is so great that they have had thoughts of sending their Transactions here to be printed. We sincerely hope that our fellow-labourers in the East will take some effectual steps by which we may be put in possession of the result of those interesting researches, for which the naval, military, and civil services of India have been so conspicuous.

CEYLON.—The latest accounts from Columbo announce the arrival there of Mr. C. L. Mitford, after having traversed Asia Minor, Syria, Palestine, Mesopotamia, Babylon, &c. by Hamadan, through Khorassan, Afghanistan, and Sinde, to Bombay. This route by an experienced traveller cannot fail to add to our stock of geographical data for improving our knowledge of a country in which British interests are every year acquiring additional importance.

#### AFRICA.

EGYPT.—I am at all times happy to announce any circumstances which arise to connect the progress of geography with any other pursuit of science, literature, history, or art; for it is no less instructive than agreeable to watch how the several branches of instruction are interwoven with each other, how they are linked, as it were, together, and how, though at times one may perchance be fostered more particularly by accident or by favour, as a general rule, they all rise, flourish, and fall, under the same circumstances, accidental or otherwise, of protection or persecution. M. Letronne, member of the Institute of France, illustrious for his labours in the several departments of philology, Græco-Egyptian inscriptions, and the history and character of the fine arts in Greece, has just commenced the publication of a very learned and useful work on the Greek and Latin inscriptions copied from the monuments, the rocks, the tombs, and the papyri of Egypt. His ample illustrations of these inscriptions, embracing as they do the whole basin of the Nile from the frontiers of Nubia, the Fayoum, and the desert between the river and the Red Sea, tend to clear up many doubtful points of the topography of Egypt; and in particular I would call the attention of the Society to the use which M. Letronne has made of the paper communicated by Sir G. Wilkinson, published in the second volume of our Transactions, on the granite and porphyry quarries in the elevated range on each side of the 26th parallel of latitude, between Coptos on the E. bank of the Nile, and the port of Philotera on the Red Sea coast. These quarries are situated on one or other of the roads frequented by the ancients, leading from points on the river to others on the sea. In D'Anville's map of this region, it is called Mons Porphyrites; but from Sir G. Wilkinson's description, and from the

tenor of the inscriptions which he copied there, it is evident that that appellation, *Porphyrites Mons*, can only apply to a part of the range, namely, the most northerly, where are the quarries exclusively of porphyry, but that the name given to the whole range, in the authorities which first speak of it, was *Mons Claudianus*; and there is every reason to suppose that this name was given to it because these quarries, particularly those of porphyry, were first discovered, or at least first turned to account, in the reign of the Emperor Claudius.

M. Letronne then proceeds to show the extreme probability, indeed the almost demonstrated necessity, from the structure of the country, of its having been the practice, after the discovery of these quarries, and as long as they continued to be worked, *i. e.* from the time of Ptolemy Philadelphus to the reign of the Antonines, to convey the large blocks of granite or porphyry which they yielded, and which were wanted, at first for the Egyptian temples under the Greek kings, and afterwards either for Rome or for Constantinople, or even for Alexandria, not westward over the crest of the bare rocks to the banks of the river, but eastward along a more or less regularly inclined plane, a shorter and more commodious route to the Red Sea. These blocks were then floated to the head of that gulf, where, at the town of Arsinoë, they were conveyed into the canal, and thence by the Nile to their respective destinations; and this M. Letronne thinks to have been, for a considerable length of time, one main purpose for which this celebrated canal was made use of. On this occasion M. Letronne has very happily applied his familiarity with the ancient geographers and writers of the first and second centuries to a consistent geographical arrangement of the hitherto uncertainly defined port of Arsinoë, at the embouchure of the canal, then the town of Philotera, then further south, on the western shore of the Red Sea, another Arsinoë; then the port of Philotera; and so on successively, to Myos Hormos, and Berenice. Of these two quarries of porphyry and granite in the *Mons Claudianus*, M. Letronne thinks that the latter ceased to be worked about the time of the Antonines, which was also coeval with the filling up in part, from neglect or accident, of the great canal, and with the discovery of other granite quarries nearer to the Nile, which yielded large blocks; but that those of porphyry continued to be worked certainly till the reign of Diocletian; and he adds that passages from Paulus Silentiarius prove that they were in request at a still later period, when, however, it being no longer the practice to extract such colossal blocks, they were removed by the shorter and more direct route to some place of embarkation on the bank of the river.

There is a point in the geography of this part of the world in which we, as subjects of a great commercial nation, are most immediately



interested, to which attention has already been given, but which is, I am assured, up to this moment very inaccurately defined. I mean the doubt which still hangs over what are called the ascertained positions of Alexandria in Egypt, and Suez at the head of the Red Sea.

Captain W. H. Smyth places the Pharos of Alexandria . . .  $29^{\circ} 52' 51''$  E. long.  
The chart constructed by Moresby and Careless, E.I.C., places Suez  $32^{\circ} 39' 0''$  E. long.

In the chart the longitudes are deduced from Bombay, on the assumption that Horsburgh's longitude of that town is correct ( $72^{\circ} 57' 40''$  E.). Mr. Goldyngham has since, by a series of lunars, and observations of Jupiter's satellites, made Bombay  $72^{\circ} 54' 36''$  E., *i. e.* about 3' farther W. Deducting, therefore, these 3' from the position of Suez on Moresby's chart, will give for Suez  $32^{\circ} 36' 0''$  E. Even this reduction, however, leaves the difference of longitude between Alexandria (as fixed by Smyth) and Suez (as fixed by Moresby) 6' in excess of the difference as shown by Captain Haviland's measurements with a perambulator, when the Indian army was in Egypt.

In the *Connaissance des Temps* (1841) these places are given (reducing the longitude to Greenwich): long. Alexandria,  $29^{\circ} 52' 59''$ ; and Suez,  $32^{\circ} 31' 28''$ ; difference,  $2^{\circ} 36' 29''$ . This is  $7' 40''$  greater than the difference between their positions according to the English navigators, and  $1' 40''$  greater than the difference resulting from Haviland's perambulator measurements.

These statements would show the uncertainty in which we are respecting the position of Suez, and it may be suspected that the position of Alexandria is not much more to be relied on.

The coast of Northern Africa has been surveyed better by French and English navigators, from Alexandria to the Straits. A survey of the coast of Syria is now in progress by command of the Admiralty. Of course it will be extended from El Arish to Alexandria, in order to connect it with Smyth's survey, but this will not help us with the position of Suez.

The establishment of steam navigation by way of the Red Sea to India, and the contingent development of English commerce in these quarters, renders certainty in these matters of the greatest importance; and the point in question can perhaps only be ascertained by a trigonometrical determination of the relative positions of Suez and Alexandria, and a series of observations at both ends of the line.

If Her Majesty's Government, or the Directors of the East India Company, were, either separately or jointly, to undertake a trigonometrical survey of the Delta, it would be an operation of general utility, and not without interest to the inquirer in comparative or physical geo-

graphy, to have a general survey of the whole district lying between the four points: El Arish, Suez, the Pyramids, and Alexandria.

The liberal protection which the present Governor of Egypt has extended towards the commerce of Europeans, even under the most trying circumstances, fully warrants us in supposing that he would readily give all the aid in his power to the furtherance of an enterprise so beneficial to his own people and to the foreigners resident in the country.

ABYSSINIA.—The tide of exploration has set of late years in a particular manner towards Abyssinia. In my last anniversary address, I mentioned several travellers into that country. I may now add the name of the Baron de Wrede, who, according to a communication from Mr. Texier, intends to proceed to Shoa by Tajurrah and Housa, following up the Hawash. From Shoa he proposes to penetrate the country in a S.W. direction, in order to discover the sources of the White Nile, of the Tchadda, and the Quilimansa, following the latter to the sea, whence he will return by Hurrur and Barbera. If only a part of this vast project be successfully executed, it will be a great deal, considering the various difficulties to be surmounted.

Messrs. Ferret and Galinier, of the French Etat-Major, have lately returned to Cairo from a voyage into Abyssinia, whither they had been sent by the Minister of War; they are said to have brought with them several maps of the country. Messrs. Krapf and Sapeto have also returned from Abyssinia, the former after a sojourn of three years. He reports that Mons. D'Abbadie was still at Adowa, engaged in compiling a dictionary of the Hamtonga or Agow language, which already contains 1400 words. An English traveller of the name of Bell had arrived in the month of April at Adowa, whence, it is said, he continued his journey inland. François Rocher, who was erroneously reported to have gone to Sennaar, had proceeded to Koseir and the Red Sea. The German naturalist, Schimpfer, was with D'Abbadie at Adowa.

Dr. Beke, I am glad to say, continues his explorations in Abyssinia with the same zeal. Since the last anniversary meeting we have heard from him twice; the first time was by a communication dated Dima, 15th December, 1841, in which he detailed his route from Angolalla to Godjam. During the first part of his journey, the country, he says, was beautiful and populous. He describes the Hill Fort of Dey as being at an elevation of 7,887 feet above the sea, and lower than Angolalla by about 600 or 700 feet. This place is described as important, being the key to the high mountain district to the West, and commanding the mountains on the East. Having crossed the Bersena river, and passed over a country cultivated with pulse, tobacco, cotton, and maize, the country became again mountainous, and the traveller reached Wûla,

where he was hospitably entertained. From hence he proceeded to Angorcha, where gold had lately been found. From Angorcha Dr. Beke continued his route towards the Abâi, passing on his way a country of varying character, but having many towns and villages, and generally well cultivated. Several streams and deep and rough valleys were next crossed, and having passed the Djamina river, with a breadth of 30 yards, and a depth at that season of only 3 feet, the traveller ascended to Dâda, a little distance beyond which the Abâi became visible. On the 24th November it was reached. It is here 2936 feet above the sea, which gives a fall of about a foot per mile for its course from this spot to the Mediterranean. After having crossed the river with much difficulty, and not without loss from robbery by the natives, Dr. Beke entered the province of Godjam, and took a northerly direction. The country on both sides the stream, which was not quite 200 yards wide, is described as jungle, but without wild beasts. Proceeding onwards, he arrived at the church of St. Abo, and the plain country of Godjam, which he traversed without assistance, and at length reached Dima, commonly known as Dima Gurjis, from the large monastery and church of St. George which it contains. The town is described as large and well constructed. From the time this account reached us, we have had no further news from Dr. Beke till about three weeks ago, when a letter was received from him, dated Dembecha, February 5, 1842. In this letter the traveller states that he was detained some time at Dima by a cutaneous disorder, which he attributes to the particular kind of diet he had been reduced to. He left Dima on the 20th January, 1842, on his way to Dembecha. Having crossed the river Gad, he entered the district of Yazima. The direction now taken was a little to the S. of W. On the right rose the lofty mountains called Tal ha Waha, said to be covered with perpetual snow. From these heights numerous streams descended, forming the head waters of the Abâi; these had their courses towards the S.E. and S., and were successively crossed. The country was sometimes rough and irregular, sometimes level, grassy, and with trees, and little cultivation was seen. On the 21st the monastery of Yederebân was reached; here the ground was found clothed with numerous acacias and wild rose bushes, but it soon resumes its former more general character, that of a mere grassy plain. On the 22nd, the traveller came to a spot, which he regards as the water-shed between the streams flowing East and West. The rivers here were sluggish, and Dr. Beke thinks that in the wet season the country must be swampy. This day the river Didjil was reached, whose waters were creeping towards the N.W. On the 24th, the traveller left the village of Lachilachita, where he had rested the previous day. He skirted an extensive jungle, and



crossed different windings of the Didjil, which flows into the Godib. On crossing the Didjil for the last time, and entering the province of Damot, the difference of the two provinces soon became evident. Godjam is almost bare of trees, while Damot is celebrated for its beautiful forests. Damot is also more peopled, and numerous villages were seen on the way. The Godel has a slow current, its direction W.S.W.; it is 30 feet wide, and 2 feet deep. The road from Lachilachita had changed its direction to N.W., and from Arrat, the place now reached by the traveller, it went due N. to Dembecha, rounding the foot of the Tal ba Waha mountains. The streams now ran in a south-westerly direction, and where the Samsha was crossed its course was westerly, between steep banks, with a strong current and stony bottom. On the 27th the traveller reached the large town of Dembech, but not having yet entered it, and being encamped outside, he leaves the description of the place, and a more detailed account of his route, for a future communication.

M. Blondel, Belgian Consul-General in Egypt, who had undertaken a journey into Abyssinia, had been detained prisoner in that country, but was happily released by the exertions in his behalf of the Pacha of Egypt; he has since returned to Cairo.

M. Antoine d'Abbadie has communicated several interesting notices on the geography of South-Eastern Africa to the Geographical Society of Paris, and has been honoured with their silver medal.

*Bahr el Abiad.*—It is known to you that two expeditions have been fitted out by the Viceroy of Egypt, for the exploration of the White Nile, but no details had reached us when I last addressed you.

The *first expedition*, under the conduct of Selim Bimbashi of the Alexandrian navy, left Khartúm on the 17th Nov., 1839, and ascended the stream for 72 days. Observations were made daily of the distances gone over, the breadth and depth of the river, the velocity of the current, and the temperature. But I must refer you for the very interesting details of this expedition to the Nos. 103, 104, and 105 of the *Bulletin* of the Geographical Society of Paris; regretting, however, that the account contains no precise geographical information. In this expedition the party ascended the river to the sixth parallel of North latitude.

The *second expedition* was accompanied by two Europeans, Messrs. Arnauld and Sabatier. They left Khartúm on the 25th Nov., 1840, returned there in 1841, and again proceeded on the 26th September of the same year. This expedition ascended the White Nile for a distance of 518 leagues from Khartúm, and reached a spot in lat.  $4^{\circ} 42'$  N., and a little to the E. of the meridian of Cairo. The want of water at that season of the year prevented their further progress; but when the waters are high, the stream may be navigated, it is said, as far as the

third parallel of N. lat. In lat.  $7^{\circ} 43'$ , a stream came in from the E., and a larger one from the W., which latter is supposed by M. Arnauld to be the Keilak or Misselad of Brown. The great body of water, however, came from E.S.E., and this was therefore concluded to be the true Nile. Arrived at their furthest, in lat.  $4^{\circ} 42'$ , they yet saw no high lands, so that the far famed mountains of the Moon must disappear from our maps. The bifurcations of the rivers are formed by islands only, and in about the ninth degree of N. lat. there are immense marshes. Several tribes, differing widely from one another, are mentioned as having been met with, and some are said to be quiet and peaceful. In the dominions of the King of the Behrs various articles of Indian merchandise were found. The king's palace is on the waters, and can be approached only by swimming. His guards are two battalions of women, armed with spears and bucklers, and his ministers never enter the palace but when the king is supposed to be dangerously ill, when it becomes their duty to strangle him, that he may not die a natural death, like the vilest of his subjects.\* M. Arnauld had made valuable collections, but being wrecked in the river, he lost every thing but his Journal, and only saved his life by swimming for upwards of two hours. He is stated to have made astronomical observations at every station. It is therefore to be hoped the geographical details of this interesting expedition will soon be made public, with a map, and new light be thus thrown on the so long dubious point, as to whether the White Nile or the Blue Nile be the great feeder and chief source of the river.

*Bahr el Azrek.*—The Bulletin of the Société de Géographie contains also a letter addressed to M. Cochelet, the French Consul-General in Egypt, by M. Lefevre, whom I mentioned in my last address as having communicated some interesting papers on Abyssinia to the same Journal, and whose death I have with regret announced to you. In the letter to which I now allude, M. Lefevre describes the nature of the commerce and the character of the people on the Blue Nile, and gives a short account of the country of Bertha, a mountainous district lying between the Bahr el Azrek and one of its tributaries, the Tumat. Gold dust is found in the mountain streams of the Bertha. This metal, either in its crude state, or worked into wire of various thickness, is the grand medium of exchange in Bertha, and in the Fazoglou, and immediate neighbourhood. Annual fairs are held at Benichangoul and at Farmaca (not on our maps). Fadassi is the capital of the territory of the Bimbichi. M. Lefevre gives the names of the several stations on the route followed by the merchants who go from Fazoglou to Fadassi, which, it

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\* Bulletin de la Société de Géographie. Nov. 1842. Page 351.

appears, occupies  $6\frac{1}{2}$  days. The places mentioned by him are not to be found on our maps, and as their direction is not given, we may presume M. Lefevre has not been there himself, but has given the names of the stations from native information.

*West Coast.*—Captain Allen, so well known to you for his excellent survey of the Niger, and for his contempt of danger in the expeditions up that fatal river, has recently added to our knowledge of the Western Coast of Africa by his exploration of the Cameroons river, and the Bay of Amboises. In the months of May and June, while waiting on the coast for orders, Captain Allen seized the opportunity of examining the Cameroons river. By carefully feeling his way with the lead, he took the Wilberforce up to the anchorage of the palm ships in the estuary; here he found an important community under two chiefs, King Bell and King Aqua; the houses were well built, and the grounds well cultivated. From this place he ascended the river in boats, accompanied by Lieut. Sidney, surveying officer, Mr. Terry, chief clerk to the Commissioners, Mr. Sterling, assistant-surgeon, and Mr. Lilley, a volunteer. King Bell and Prince Bebbo also attended the party. Having passed shoals and mudbanks, where mangroves and decayed vegetable matter produced a most offensive odour, they reached an open expanse of water, and there entered a narrow channel, in which the mangroves ceased as the salt water terminated. In the undivided stream there was a breadth of 500 yards, the banks low but firm, and covered with high grass, behind which were ferns, plantations, and bushes in endless variety. Villages became numerous as they proceeded; their appearance was neat, and the cultivation around denoted plenty and comfort. At three miles from the head of the Delta, the Yabiary river came in from the W., navigable, it was said, to Abo, which might be reached from where they were at sunset. A little above the confluence, the Cameroons forms two branches, inclosing the island of Wúri, which Captain Allen went round, ascending by the western, and returning by the eastern branch of the river. He next ascended the Yabiary to within a short distance of Abo, and returning thence the party regained the Wilberforce in safety. In this excursion the river had been ascended to 40 miles from the sea. In the floods it has water enough for any draught, but at 90 miles from the sea the navigation is said to be interrupted by rocks. Captain Allen was prevented from exploring the Qua Qua River, but he surveyed the Cameroons or Dualla from Bell's Town downwards, and connected it with Captain Vidal's survey. A slight attack of fever induced the Captain to hasten to the Bay of Amboises, or Ambas, which he examined, and has described; and he thinks that from the peculiarity of its situation, and from local circumstances, this bay will be



found the most healthy position on this coast of Africa. The anchorage is excellent, both as to holding ground and depth. Although a lee shore, it never blows hard. The breeze from the Atlantic is refreshing. There are but few mangroves or marshes, water is excellent, and provision abundant and cheaper than at Fernando Po.

#### NORTH AMERICA.

I now beg leave to call your attention to some objects of geographical interest in the New World.

NEWFOUNDLAND.—Besides the map of Newfoundland by Mr. Arrowsmith, two works upon that country have lately appeared—the one by Mr. J. B. Jukes, and the other by Sir R. H. Bonnycastle. Of Newfoundland very little was generally known; and although both the writers just mentioned have considered the country more especially under a geological point of view, and differ in their opinions of the importance and value of the colony, still they afford geographical information of some interest. Mr. Jukes has a chapter exclusively on the Physical Geography of Newfoundland, by which it appears that a great part of the western portion of the country presents only woods, marshes, and barrens, alternating with each other. The most remarkable feature, however, is the great extent of lagoons and ponds, varying in size from pools of 50 yards in diameter to lakes upwards of 30 miles long and 4 or 5 across. The quantity of ground covered with fresh water has been estimated at one-third of the whole island, which Mr. Jukes thinks is not exaggerated. The overflow of these lakes is intercepted and absorbed by the spongy marshes, so that the island has no large rivers. The country is rugged; the hills, however, rarely rising to the height of mountains, and the hollows or valleys as rarely expanding into plains. The interior is still little, if at all, known; it contains an immense coal-field, and, according to Sir Richard Bonnycastle, whose account is considerably at variance with that of Mr. Jukes, it has, particularly along its western coast, many cultivable spots, and capable of giving subsistence to a greatly extended population.

Sir Richard's book contains a more complete account of the political geography of the settled part of the island than any previous work, with copious details of its climate and meteorology, agricultural resources, and fisheries, and notices of Red Indian nations now supposed to be extinct. The maps which accompany both works have little pretensions to accuracy, beyond a partial indication of the probable geological structure of the country. Mr. Arrowsmith has, however, compiled a map of Newfoundland from materials furnished by the Admiralty and Colonial Office. The Eastern coast line from Belleisle to Cape Race has been

laid down according to the survey of Captain Bullock: the relative positions of places on the coast as given by that officer being preserved, but the latitudes and longitudes of all corrected by the more recent observations of Mr. Jones of H.M.S. *Hussar*. The southern coast, from Cape Race to Cape Ray, is taken in part from the positions determined by Mr. Jones, and in part from the old but excellent survey of Cook. The western coast, from Cape Ray to Belleisle, is laid down according to Cook's survey. The interior is—*First*, from three routes of Mr. Cormack; in 1822 from the head of Random Sound, on the E. coast to St. George's Bay on the W.; in 1827 from the Bay of Exploits to the head of Hall's Bay, and a chain of lakes 30 miles further W., and back to the Bay of Exploits, by a line nearly parallel and more to the S., and subsequently along the E. shore of the narrow part of the island to the N., from Hares Bay to the bottom of White Bay. *Secondly*, Captain Buchan's route from Hall's Bay to the southern extremity of the Grand Pond. *Thirdly*, Mr. Jukes's short excursion, from the S. coast of St. George's Bay to the interior. A "preferred line of exploration," laid down in Sir Richard Bonnycastle's map, from the northernmost point of Placentia Bay to the S.E. shore of Grand Pond, is only about 150 miles in length, and would intersect the country midway between Mr. Cormack's routes in 1822 and 1827, and would go far to increase and correct a knowledge of the interior.

UNITED STATES.—Messrs. Sherman and Smith, of New York, have nearly completed a large and well engraved map of the United States. It has been prepared with great care by Mr. Smith; but, like the maps of most young geographers, is too much crowded. Thus he has introduced the *townships* of each state, a proceeding the more injudicious as they are continually undergoing changes, and it is utterly impossible to keep pace with them.

The system of executing maps on wood is much practised in America, especially by those whose only or chief aim is pecuniary advantage; but they have a coarse appearance, and will doubtless be soon rejected by the public.

A map of the United States, on a small scale, has been published by S. A. Mitchell, cut on wood; and, although neatly executed, it has a slovenly appearance, and is full of errors; even the projection is defective in the extreme, the proper lengths of the degrees of latitude and longitude appear to have been wholly disregarded. With these exceptions no maps of any consequence have appeared since last year.

Mr. Tanner, our corresponding member at Philadelphia, is engaged on a general Geographical, Historical, and Statistical Atlas; the maps will be somewhat smaller than those of his Universal Atlas, published

some years since, and accompanied by descriptive letterpress, statistical tables, and a general consulting index. It is to be published in monthly parts, the first of which is nearly ready. The several parts will be forwarded to us as they appear.

With the exception of a journal of travels to the Columbia river, by Mr. Farnham, nothing has appeared in relation to unknown regions. The work of Mr. Farnham, which we are promised, is said to afford but little additional information on the geography of Oregon, the work being mostly filled with the incidents of the writer's journey; but some facts may, it is added, be gleaned from it.

Mr. Nicolai's map of the N.W. section of the United States is still in the hands of the engraver, as well as most of those of Hasler's survey of the Atlantic coast. This survey, it is feared, will be abandoned; or, if continued, is likely to be prosecuted with more vigour and less precision by others than was done by Mr. Hasler, who is now very old and infirm.

The surveys of Pennsylvania, New York, and New Jersey are completed. A report on the former is in course of preparation by Professor Rogers, the gentleman under whose direction it was made. The topographical surveys of the public lands continue to be steadily prosecuted under the treasury department of the general government.

#### CENTRAL AMERICA.

*Norman's and Stephens's Works.*—From Central America we have two works, which call for some notice, as illustrative of the ancient and modern state of the country—Mr. Norman's '*Antiquary Tour in Yucatan*,' and Mr. Stephens's '*Incidents of Travel in Yucatan*.' The last mentioned of these works has already obtained a well-deserved popularity in this country. It contains the results of an exploratory excursion in Yucatan, supplementary to a previous one in Guatemala, during which, with the aid of my esteemed friend Mr. Catherwood, he excavated, measured, and delineated with considerable success. Mr. Stephens's two publications together form an important contribution to the positive and comparative geography of the countries now comprised under the general designations of Central America, and the province of Yucatan, and may give us some vague notions of the social and natural history of the tribes, who ruled in the same regions previous to the arrival of the European race, and whose descendants constitute a numerical majority of its population. Mr. Stephens has fixed the sites of many aboriginal cities, and supplied correct delineations of their existing monuments; he has also succeeded in identifying some of these sites with localities which occupy a prominent place in the narratives of the



early Spanish conquerors; and there is every reason to believe that many other equally interesting monuments of a bygone state of civilization are still to be explored. Mr. Stephens's book is a fair earnest of what is still left for him or his successors to do in following up what he has so well begun. The great object will be here, as in all unexpected discoveries, to avoid rash and premature generalization, to accumulate, with untired industry, facts. These naturally divide themselves into two classes:—1. Accurate surveys of the province of Yucatan, and the federal republic of Central America, must be the groundwork of any satisfactory investigation; large portions of this tract of country in Yucatan, Vera Paz, and Tabasco are still totally unknown; and these must be accompanied with accurate delineations of the actual condition of all ancient sites and monuments. Here the daguerrotype process has already been turned to good account by Mr. Friederichstahl, an Austrian botanist: its value is eminently great in the case of newly-discovered objects, in reference to which we have no other authorities to go to, for a comparison and proof of accuracy.—2. In the next place, all the printed works, as well as such MS. compilations as are accessible, of Spanish discoverers, settlers and colonists from the first visit to the coast of Yucatan down to the present time, ought to be analysed, and their statements regarding the natives, their civil organization, and settlements should be well digested. For this purpose it may be necessary to make a search in the archives of the cities and monasteries within the district; and those of the council of the Indies may provide much useful information. When these two classes of research shall have been brought to bear on one another, the materials will exist for such a systematic synopsis of the comparative geography of these regions under aboriginal rule, and for an explanation of the affinities of their various tribes as we can hope to obtain, or as can possess any scientific value. Though we have little ground for hoping that the hieroglyphic writings of the primitive Americans, if they should ever be deciphered, will throw any considerable light on the progress of art or science; yet they may disclose some historical facts of value, respecting the sources of the early population of the country—the constitution of their language, and possibly also on the successive development of the human intellect. On this subject I willingly refer to the splendid work entitled '*Les Antiquités Américaines*,' lately published at Paris, under the superintendence of the Comte de St. Priest.

*Isthmus.*—We are not yet in possession of any positive and detailed information respecting the progress of that great undertaking which has attracted the attention of the speculators and geographers of the Old and New Worlds, almost ever since the discovery of the latter; but most

especially, at intervals, for the last 150 years: I mean the means of establishing a water communication between the Atlantic and the Pacific: but it may be mentioned that M. Manel, a French engineer, in the employment of some gentlemen who hold from the Grenadine government the privilege of constructing a canal across the isthmus of Panama, has been engaged during the years 1837-41 in making a survey of the country. M. Manel states that by ascending the Farfan, seven miles above its embouchure, on the E. bank of the Rio Grande, he was able to cross to the Trinidad, an affluent of the Chagres, by a route 25 miles in length, on which the summit level between the oceans was less than 34 feet. By ascending the Rio Grande he was able to cross the isthmus by a route a few miles to the N. of about the same length, and with nearly the same height of summit level. This indicates that the high mountains N. of Panama sink down nearly to a level with the ocean about the parallel of that town. The sources of the Chiamito, which falls into the Bay of Chorera, and of the Trinidad, are near each other, and to the south of the lines explored by M. Manel. This seems to indicate that the ground rises again immediately to the south of them; for the Trinidad, at the point where M. Manel's southern line strikes, is navigable for vessels of 200 tons, with a current of a mile and a third per hour. This appears to imply a considerable length of course, and a rather elevated source. The rocks along both lines are calcareous, interchanging with sandstone: the country is covered with dense forests.

#### SOUTH AMERICA.

BRITISH GUAYANA.—Few, or rather none, of our colonies have been more fortunate than British Guayana in having so excellent an explorer as Mr. Schomburgk. Time will not allow me, however, to state to you what he has done in that part of the world; and his successive labours have been already made known to you in different volumes of our Journal, and in former annual addresses from this chair. His explorations of the mouths of the rivers Barima and Waini, and his subsequent ascent of the former of these rivers and of others connected with it, to which I alluded last year, have been read at the evening meetings, and are now given at length with illustrative maps in the just published part of the Journal. Since the termination of those researches, as valuable to the colony as they are interesting to science, Mr. Schomburgk has successfully terminated another exploration, for the details of which we are again indebted to the kindness of Her Majesty's government. Mr. Schomburgk having quitted Pirara on the 26th of March, 1842, arrived at the junction of the Mahu with the Takutu, on the 2nd of April. The point of confluence was found to be in  $3^{\circ} 35' 8''$  N., and the difference of longitude

from Pirara 1m. 36s. 11 W. in time. The water in the Takutu was low, and the ascent of the river in canals consequently tedious. Among other objects found in the bed of the Takutu, a black sand was occasionally met with containing gold, but whether in sufficient quantity to render it worth the washing, Mr. Schomburgk had not time or means to determine. The Takutu, which has a N. and S. course between the Rio Branco and the Rupununi, runs through savannahs, whose surface is covered with a vast abundance of angular masses of quartz rock, while the subsoil is a white ochreous clay mixed with rounded pebbles, covered by a few inches of vegetable mould. These savannahs, in the traveller's opinion, are of no use but as grazing lands. Continuing the ascent of the river, different affluents were passed, and some mountains of considerable elevation. By one of these affluents the Curati, and a short portage to the Guidiwau, an affluent of the Rio Branco, this latter river is reached. By the 6th of May a spot was reached where the river was only a few feet wide, and its waters collected into almost stagnant pools, the colour of which was nearly black; while lower down it was bluish. Continuing to ascend, Mr. Schomburgk arrived at the source of the river, whose position he ascertained to be in  $1^{\circ} 50'$  N., and 19 miles W. from Pirara. The next morning the party retraced their steps, and arrived at Pirara on the 22nd of May, having been absent nearly two months, and having suffered severely from fatigue and excessive heat. The details of this journey are rich in descriptions of the animal and vegetable productions of the basin of the Takutu, and will be read with interest in the forthcoming number of our Journal. On his return from the Takutu Mr. Schomburgk ascended the Cotinga to Roraima, from whence he struck off through the savannahs and forests to reach the Cuyuni. This journey was as novel and interesting as it was fatiguing: in the course of it he discovered many new plants, and saw hundreds of acres of plantains growing wild, and so luxuriantly that some of the stems were as thick as a man's body, and attained a height of 40 and 50 feet. Soon after his return to George Town, he again started with a view to explore that part of Guayana which lies between the upper courses of the Essequibo and Corentyn. Since which we have not heard from him. This expedition will occupy at least six months, so that some time must elapse before we get any further communications. It is greatly to be hoped that his constitution will not sink under such unremitting fatigue, fatigue greatly increased by the fact of his having been nearly all the time without an assistant surveyor. Indeed, as he himself says, he has not yet been able to find time to draw up a detailed account of his journey from Pirara to Roraima, and from thence to the Cuyuni, nor to work out the results of his many astronomical and



magnetic observations. His plan for the survey he is now engaged in, was to join at Pirara Mr. Goodall, the artist, and others of the expedition, and to start thence for the sources of the Essequibo; then to trace the mountains which divide the basin of the Amazons from that of the Essequibo and Corentyn, and to descend the latter river to its embouchure. His health has hitherto been good; we hope sincerely, both for his own sake and that of science, that it may continue so.

FALKLAND ISLANDS.—Among the many advantages of geographical science may be mentioned the discovery, in distant countries, of productions which, by living and flourishing in our own, may be made to contribute to the wealth and resources of our countrymen. Thus, from the reports of Lieut. Moody, Governor of the Falkland Islands, and which reports have been communicated to this Society by Lord Stanley, it appears that the tussac-grass, mentioned by navigators who had previously visited these islands, is likely to become of the greatest advantage to some parts of Great Britain, and particularly to Ireland, where extensive and unprofitable marshes usurp the place of productive soil. For it is precisely in such situations, particularly if within the influence of spray from the sea, that the tussac-grass, so valuable for the feeding of cattle, is always found, and thrives best. With respect to the Falkland Islands themselves, the nature of the climate, and the advantages afforded by the soil for sheep and cattle feeding, bid fair to raise them into importance as a grazing colony; while as a station for vessels doubling Cape Horn, they are admirably situated.

NEW ZEALAND.—The colonization of these islands has produced a great many books professing to treat of them; but from all that have hitherto appeared, little geographical information can be gleaned: the partial and insulated surveys which have been undertaken, being quite unconnected with any general base line, or system of triangulation, have done little towards producing a true picture of the features of the country; nor is it likely that any general survey will be attempted till the prosperity of the colony shall be able to furnish the expense of it. Much, however, may be gleaned from what has been published, and chiefly from the late work of the naturalist of the New Zealand Company, respecting the productions of the islands, the general character of the country, and its original inhabitants. Dr. Dieffenbach dwells chiefly upon their natural history, and the language of the natives, of which he gives a copious vocabulary and the outline of a grammar: and the observations he has made in various exploratory excursions convey a better notion of the physical geography of the islands than has been given by any previous writer. He suggests one very important inquiry while speaking of the whale-fishery. It is the opinion

of the whalers that the range within which these animals are found most abundantly south of the Equator is a great bank, over which the water may be said to be shallow when compared with the depths of the surrounding ocean. Dr. Dieffenbach expresses a wish that this hypothesis should be tested by deep sea-lines; such an investigation might throw additional light on the structure of the submarine portions of our earth.

#### MISCELLANEOUS.

*Cartography.*—As an improvement in the material construction of maps, I may state that the parallel lines representing seas and lakes, &c. are now produced by a machine made by Mr. Sang, Professor of Engineering in Manchester, which cuts the lines at once instead of drawing them on an etching ground as formerly; a process which produces much better work, and in a much shorter time. The result of this practice may be seen on some of the maps lately published by the Messrs. Johnston of Edinburgh.

*Ethnology.*—The importance of the study of languages in an ethnological point of view is too well known for me to dwell upon them; but every accession to this branch of knowledge which is made cannot but be interesting to us as tending to throw fresh light upon the very curious problem of the former connection and present dispersion of the various races of mankind; you will therefore be glad to learn that Messrs. C. G. Teichelmann and C. W. Schürmann have just published '*Outlines of a Grammar of the Aboriginal Language of South Australia.*' In this work the author maintains the opinion held by others, that the languages of all the Australian tribes, except those on the N. coast, are derived from one and the same source; and that, consequently, all the native population, with the above exception, are of the same race.

\* Dr. Pritchard has also published, as a sequel to his learned work on the '*Physical History of Mankind,*' another volume entitled '*The Natural History of Man,*' beautifully illustrated, and accompanied with an illustrated ethnological atlas.

*Manuscript Map of Peking.*—Amongst the geographical novelties of the year, I may mention the acquisition, by Sir Woodbine Parish, whilst at Naples, of a very beautiful manuscript plan of the Tartar or northern city of Peking; on which are represented, with some detail, the walls and gates of the city, the Imperial palace, the public treasuries, the Imperial cemetery and summer houses, the public offices, the observatory, &c.: the space within the walls is between sixteen and seventeen miles.

The plan has since been most successfully lithographed by Major Jervis, late of the E. I. C. corps of engineers ; who has had the Chinese names of places translated. Major Jervis proposes to accompany it with some extracts from Father Hyacinthe's topographical description of the city.

*Pizzigani MS. Map.*—The Society is indebted to the liberality of one of the most distinguished of their foreign honorary members, Admiral von Krusenstern, for the possession of a beautiful copy of the MS. *Planisphere-Mappa Mondo*, now in the Imperial Library at Parma. The original of this map, on vellum, is described by Angelo Pizzara, keeper of that library, as bearing date the 12th of December, 1367, according to the following inscription :—"Hoc opus composuit Franciscus Pizigano Venetianen. et Dominicus Pizigano. In Venetia me fecit Maretis die 12 Decembri." It is stated to contain the whole of the world then known ; and, considering its date, to be a *chef d'œuvre* in regard to design and exactness of representation. Many of the principal towns are neatly traced, with some characteristic features of the countries. It was formerly in the possession of Girolamo Zauetti, the author of a work entitled '*Origine di alcune Arti principali presso i Veneziani*,' in 1758 ; and who presented it to the Ducal Library at Parma, out of regard to P. M. Paciaudi, the librarian.

In this country, where almost everything is left to individual exertion, the defects inherent to a system of centralization are unknown ; but we are also deprived of those manifold advantages which arise from its application to certain objects. Thus, it can hardly be doubted that a grand central map department or establishment under the control of, or at least patronised and supported by, the government, and under the superintendence of an able director, would go far towards the diffusion of correct geographical information. Such an establishment, receiving from the various departments of the government the original surveys forwarded to them from our colonies and other possessions abroad, would possess the most authentic materials for the protraction of hitherto unknown regions, and for the gradual correction of those errors, which, by the present mode, are inseparable from our most carefully and conscientiously constructed maps. The first object of most map-makers, in all countries, is pecuniary advantage, and in accordance with this they cater to the wants of the moment, heedless of the quality of the article they supply. With such an establishment as I have alluded to, it would be otherwise ; its primary object would be the construction of correct maps ; and as those bearing the stamp of authority would soon be preferred to all others, remuneration would



follow as a necessary consequence. Nor is it to be implied that map-makers promulgate error designedly; on the contrary, it is their interest to make their maps as correct as possible; but while, on the one hand, they have not generally access to the latest and best materials, so, on the other, the political events of the day frequently occasion a sudden call for chorographic maps, which, by being immediately responded to, offers a chance of profit too great not to be eagerly seized; and thus crude and ill digested delineations are dispersed, to the injury of science. Some there certainly are who have a higher ambition, and who seek not only to combine profit with reputation for accuracy, but who are content to let their ultimate advantage be contingent on proof of their scientific ability: such will ever be patronized by the discerning portion of the public; but even the establishments of these meritorious individuals must be greatly deficient in the requisite resources for map-making on a large scale. The care and time required for the collation of materials, the reductions, the copyings and corrections, both before and after engraving, are such that nothing but an extensive sale can remunerate; but to supply an extensive sale, large means of commanding the services of engravers, printers, &c., are requisite; all which demands great capital and extensive premises. Centralization in this department would have the further advantage of ensuring a more perfect and systematic uniformity in cartography. At present, each map-maker has his own method of drawing, shading, colouring, and writing. Accuracy is often sacrificed to beauty of appearance. The scales of maps are arbitrarily varied, and different projections adopted for the same country or portion of a country; so that the same region presents to the eye a different contour, to the utter confusion of all definite ideas. These are disadvantages which one central cartographic establishment would greatly diminish or wholly do away with: nor is this all; the department or establishment in question would become the grand dépôt of geographical archives, as essential to the government as to the public. It could effect the most desirable exchanges of its productions with the maps, charts, and memoirs of other countries; and lastly, not the least of its advantages would be the training of an efficient body of practical geographers.

The preceding observations forcibly recall to my memory, and perhaps they may do the same to some whom I am addressing, the purport of the discourse which I had the honour of delivering to you on the anniversary of 1839, in reference to the value of accurate geographical knowledge in our military, diplomatic, and commercial relations. Their importance will not sound in your ears the less to be appreciated than

it was four years ago; and though one subject of discussion, at that period thought to be almost interminable, has, by the prudence of our councils, been brought to a conclusion; in a manner, too, which I trust will not lead to further misunderstandings in reducing it to practice, still are there other sources of disagreement between us and our Transatlantic brethren, which can only be allayed by a knowledge of the ground we are contending for. I do not propose to allude further to that subject; but the events of the last two years in the countries west of the Indus are too fresh in our memory to allow us to remain insensible to the paramount importance of acquiring a knowledge of the geography of all countries conterminous to our own possessions, with the least possible loss of time. The operations of war do perhaps lead to this knowledge in a more direct and rapid manner than the deliberate movements of a state of peace; but we pay an exorbitant price for knowledge so acquired, and gold may be purchased too dearly.

Notwithstanding the large demands which I have made upon your patience upon this occasion—the fourth occasion, I am proud to say, on which I have performed, however inadequately, this most honourable and pleasing duty of the President of the Royal Geographical Society—you must yet be sensible that I have passed over in silence a large portion of the accessions to geographical knowledge which have been acquired during the expired year. Some of the most important points I have attempted to bring before you. For others I refer you with satisfaction to our own Journal, and also to the eloquent and very comprehensive discourse which the President of the Geographical Society of Paris, M. Cunin Gridaine, delivered at their anniversary meeting on the 30th of December, last year. But, Gentlemen, although much has been done since I had last the honour to address you, much more will, I hope, be effected in the year now opening upon us; and in the same degree in which I have felt my own inability to do justice to the position in which you placed me, do I exult and rejoice for your sakes, and in the name of the noble pursuit we are engaged in, that the gentleman whom you are about to elect as my successor will bring to your service and councils a name, already decked with the most distinguished honours, which he could have received from the professors of the kindred science of geology—one whose travels in the south as in the north of Europe have fitted him peculiarly for this chair—one who, from the knowledge which he has gathered in the forests of the Tyrol, and in various other parts of our continent, and most eminently of late in the

ranges of the Ural, on the borders of the Asiatic and European continents, has essentially contributed to extend our acquaintance with the forms and construction of those countries, and has ever been sensibly alive to the interests and pursuits of this Society.

I beg you, therefore, Gentlemen, to remember, that under the presidency of Mr. Murchison, you will not be expected to remain idle spectators of what the rest of the world is doing in the cause of geography; he has a peculiar antipathy to drones, his friends are all working bees, after his own fashion, and I shall be very much disappointed, if, at the close of his biennial career of office, the Royal Geographical Society of London shall not have gathered fresh laurels from the garden of scientific discovery, shall not have effected something eminently deserving of its name, and of the royal patronage which we have received. Amongst other projects opened to our ambition has been suggested to us, by an active and most intelligent officer of the Society, a new map of the Chinese Empire; for which the events of late years must, in great part, have provided ample materials: I mean especially the frontiers of that vast empire. The interior cannot, of course, be well mapped until further opportunities shall have offered themselves for verifying and correcting the former operations of the Jesuit geographers; but there cannot be wanting the data for very great improvements along the whole of the coast, from the Tonquin Gulf to the head of the Yellow Sea; almost every part of this coast must have been more or less examined by our cruisers and steamers during the last three years, and the recent observations of Russian surveyors, astronomers, and general travellers, English and others, who have visited the eastern and northern frontiers, have greatly enlarged our knowledge of all the successive chains of those high mountainous districts which feed the several affluents of the Oxus, the Jaxartes, the Irtysh, the Obi, the Jenisei, Lena, and Amour. But we must not yet expect, whatever pains we may bestow upon it, to bring such a vast undertaking to anything approaching to a state of perfection, particularly to the N. and E. Immense tracts of country throughout this line still remain absolutely unknown, and many others, though successively explored, have never been surveyed; but we may lay the foundations of something better than has yet been attempted; and by only proceeding to state as facts what have been ascertained as such, we may hope to lead many, and to mislead none. You are, of course, aware, and I have already alluded to this subject, of the great field of inquiry which has lately been laid open to the learned world by a deeper study of the Chinese language, for which we are chiefly indebted to the labo-  
rious spirit of enterprise amongst our neighbours the French; a closer



attention to the contents of their histories has proved that the literary men of China have for a long period of years carried on the most accurate inquiries into the geographical relations and the statistical resources of their more distant provinces, particularly towards the N.W. of the empire. Their Buddhist pilgrims have also left detailed accounts of what they saw and observed when they visited those regions, and the result has been that Chinese literature has been found to contain a most valuable mass of information respecting the early and present state of those countries, far beyond what European scholars ever gave them credit for. These authorities it must be our province to make available for the purpose.

I have one more point to which I wish to draw your especial attention; though last, it is not the least; perhaps, indeed, it is of the greatest importance of any. It is not, however, the most agreeable—I mean the state of the finances of the Society. From the Report of the Council, read to the meeting by the Secretary, you have seen that we are at length out of debt, and that our real annual income is balanced by our annual expenditure; but that the Council, in order to bring this about, and to enable themselves to pay within the last year the sums expended during that year, for work which should have been done in the former year, was under the painful necessity of again trenching upon the Society's stock, which is now reduced to 2570*l.* stock, the interest upon which is 94*l.* 19*s.* per annum. The heavy expenses occasioned by the publication of the Journal still press severely upon the means in our hands; but the gratification which the individual members of the Society derive from its punctual and regular delivery, the advantage felt from the mass of useful and interesting matter the volumes continue to contain, are too great to allow of us to contemplate for an instant the suspension of that publication, or the limitation of its extent; notwithstanding the fact, which stares us in the face, that we receive back in the shape of this Journal at least one half of the amount of our annual subscription. Those, indeed, who have compounded from the beginning for their annual payments, have already received back the full value of their compositions. Our expenses are reduced to the most moderate scale, which will admit of our keeping up the necessary establishment; and the Council have long withheld their hands from the risk of incurring any extraordinary expenditure. The only and readiest means for increasing our funds, the most natural and easy, that in which we may all help, and in so helping both gratify ourselves and others, is that each of us in his own separate person do exert himself to procure an additional number of subscribers; and, in proportion as the sphere of the

Society's operations is enlarged, as the mass of useful information we are enabled annually to lay before the public is increased, as our *Journal* improves in the interest it excites, as our own individual interests in distant countries expand with the extension of our empire, the multiplication of our colonies, the opening of new marts of commercial intercourse in the different parts of the world, in proportion as these relations daily and hourly grow upon us, so must we not only not relax in our cares for the body to which we belong, but we must join heart and hand to do our best to enlarge the sphere of its activity, and to give new vigour to its life's blood.

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## PAPERS READ.

BEFORE THE

### ROYAL GEOGRAPHICAL SOCIETY.

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I.—*Excursion up the River of Cameroons and to the Bay of Amboises.* By Captain W. ALLEN, R.N.

IN the months of May and June, 1842, while waiting, with H.M. steam-vessels *Wilberforce* and *Soudan*, under my command, for orders from England respecting the future movements of the Niger Expedition, I took advantage of the delay to examine some parts of the coast of Africa situated near Fernando Po, which had been alluded to in the instructions from my Lords of the Admiralty.

I directed my attention first to the large estuary called by the Portuguese Cameroons. It had been partly surveyed by Captain Vidal; but some large rivers, which were supposed to discharge their waters into it—in particular the Malimba—remained unexplored. These I hoped to be able to examine in such a manner, at least, as would lead to a knowledge of their magnitude and importance.

By carefully feeling our way with the lead, we arrived safely at the anchorage of the palm-oil ships, in one of the rivers which has retained the name of the Cameroons. Here a considerable trade has been carried on for many years with a tribe of the natives who have settled on the lowest *diluvial* part of the left bank of the river, where, by their activity in collecting palm-oil, and their intercourse with Europeans, they have become a very large and important community, possessing such a degree of civilization as to render them, in my opinion, highly interesting, and to prepare them for becoming a connecting link between the civilized European and the less advanced natives of the interior.

These native settlers are at present subject to two chiefs, or principal traders, who have assumed a regal style and title. The towns of *King Bell* and *King Aqua*, separated only by a little brook, are of great extent inland. The houses are neatly built of bamboo, in wide and regular streets; but the number of plantain and cocoa-nut trees, and even of large fields of maize interspersed

among the houses, render it impossible to form an estimate of the size and population of the towns. I had no time to walk over them; and no credit can be attached to the extravagant estimates of the natives. They are indeed an assemblage of villages, or *towns*, as they call them; each named after the head of a family, who selects a spot of ground, and adds to his town in proportion as he increases the number of his wives and slaves. The settlements are situated on a plain, which, being elevated 50 feet above the level of the river, and being of a sandy nature, may be considered as comparatively healthy—an inference corroborated by the appearance of the natives, and the accounts of Mr. Lilley, agent to Messrs. Hamilton and Jackson, who has resided there nearly ten years.

Notwithstanding the constant intercourse kept up with the tribes of the interior—who bring down palm-oil in their canoes—the nature and even the names of the rivers which furnish the means of transport for this valuable article have hitherto remained unknown. I endeavoured to obtain information from the chiefs, and most intelligent men, but found their accounts so vague and unsatisfactory, that I resolved on penetrating as far as I could, without risking—what was of paramount importance—the health of my crew.

I first attempted to gain the main branch of the river in the Wilberforce; and with the assistance of Mr. Lilley—of King Bell—and of a good pilot, I proceeded up the Jibareh creek, which was said by the pilot Glasgow to be—though a circuitous route—the safest channel to the main river. I, however, found that it was not deep enough to warrant my going more than 7 or 8 miles from the anchorage; but before I turned back I explored another creek, the Bômano, as far as it could be done with safety. This creek had diminished very much at the highest point I reached, both in breadth and depth; and Glasgow said it terminates at about  $1\frac{1}{2}$  mile further on towards the mountains. It doubtless receives some of the drainage of the eastern portion of the range of mountains, behind the lofty Cameroons, or Mongo ma Lobah, which we could see a-head.

Having failed in the attempt to penetrate by these creeks, I tried the direct channel, which lies close to the actual left bank of the river; but found it so narrow and shallow that, considering the fearful consequences of being left aground at the spring-tide, I was obliged to abandon the idea of passing—in the steam-vessel—the Mangrove islands, which conceal the true nature of the river, and therefore resolved on trying what could be done by a short excursion in a boat. A fine forty-foot galley, which had been intended for a trip to Bussah on the Niger, was hastily fitted with double awnings, a swivel in the bow, small arms, and several

days' provisions, and with a crew of nine black men under my faithful head Kruman, Jack Smoke, who was so unwearied in his attentions to me during sickness on my first voyage up the Niger. I took with me also Lieutenant Sidney, surveying officer, Mr. Terry, chief clerk to the Commissioners, and Mr. Sterling, assistant surgeon. Mr. Lilley, agent to Messrs. Hamilton and Jackson, kindly volunteered to accompany me, and from his connexions, and knowledge of the customs of the natives, he was of the greatest service. I also engaged King Bell and Prince Beppo with their canoes of about thirty-five paddles each.

We started soon after noon on the 7th of May, 1842, with the flood-tide, beautiful weather, and an agreeable temperature. Old Glasgow, an intelligent pilot, who could speak good English, was at the helm, and, soon after leaving the vessel, we entered the narrow and direct channel on the left bank. King Bell took the lead, but was soon out of sight, as with our heavily laden boat and few paddles we could not keep pace with him. We soon found ourselves involved in a labyrinth of creeks, formed by numerous mud islands thickly overgrown with mangroves. Glasgow, however, appeared to know his way quite well, and he attended to my instructions to follow the windings of the channel, which frequently led us close to the bushes; a leadsman in the bow of the boat continually called out the soundings, and Mr. Sidney laid down the course of the river as we proceeded. In these parts we had in some places 10 feet water, but suddenly shoaling to 2 or 3 as we approached the skirts of the numerous sand-banks, which at this season sometimes stretched nearly across the river, leaving but a narrow passage—even for a boat—under the overhanging boughs of the trees.

The aspect of these islands excited anything but pleasurable emotions; for the decayed vegetable matter with which they were covered, and the slimy roots of the mangrove, emitted a highly offensive odour, and our progress was in frequent danger of interruption by the trunks and branches of fallen trees.

After an hour's paddling we got clear of the islets, and came upon a sheet of water about 2000 yards wide, from which we could see the vessels at anchor off Bell's Town, about 5 miles distant. We soon afterwards entered another narrow channel, between two islands, which were, however, of much more agreeable aspect: the mangroves disappeared at the upper end, where the pilot said the tide ceases. By this expression he only meant that the water ceases to be salt—a circumstance indicated by the change in the character of the vegetation. The swelling of the tide is felt at the farthest point which we reached in this little voyage.

The first trees, as on the Lower Niger, were low palms, with



immense arching leaves or branches (called erroneously bamboo), from which the natives extract the best palm wine, called Nimbā. The long ribs of their branches are used for the roofs of huts. With these are intermixed ferns, the pandanus, and a variety of bushes and shrubs of small growth. The foliage appeared of a healthier hue; the banks, though still low, were firm; and the richness of the vegetable kingdom increased rapidly as we advanced, especially when on leaving the narrow channel before mentioned and passing the upper end of the Jibareh creek, we attained the principal object of our little voyage—the main undivided river—a broad and magnificent stream resembling some of the reaches of the Niger below Abôh, and about 400 or 500 yards wide. The banks at the margin of the water were thickly covered with the long grass peculiar to African rivers; immediately behind came ferns, patches of plantains, and bushes of endless variety of form and foliage; many in full flower, and nearly all thickly matted with innumerable graceful creepers. Behind these rise the slender palm, the cocoa-nut, and the gigantic bombax, the strength of whose buttresses enables it to defy the rage of the tornado, and to afford shelter and protection to the numerous forest trees that group around it.

This part of the river was said to be a favourite haunt of hippopotami and alligators, though we had not an opportunity of seeing any. The afternoon was very fine, and the breeze from the sea refreshing, the temperature of the air was  $84^{\circ}$ , and that of the water  $83^{\circ}$ ; the declining sun added a tone of gaiety to the scenery. Some distance ahead, and discernible only by his British red ensign and the sparkling of the dripping paddles, King Bell's canoe glided rapidly along the left bank, his men keeping tune to the wild notes of his singing boy, which were returned distinctly by the echo of the opposite bank. Far behind us, in the long reach, came the canoe of *Prince Beppo*, also decked with a gay flag—whilst frequently on either side of us little barques, containing each but one crouching native, darted across the stream or along the dark banks, seeking shelter among the long grass, alarmed at the novel appearance of white men in these hitherto unexplored waters. Soon large huts were seen on the banks, the property of domestic slaves belonging to Bell or Aqua. There were spacious clearings around the huts, cultivated with bananas, plantains, cocoa, &c., all denoting plenty; and the cleanliness of the houses and the platforms in front far surpassed the miserable hovels of the lean and dirty "gentlemen" on the lower parts of the Niger. As we advanced, villages became numerous, and all had a comfortable appearance, being built in the neat style of the Cameroons towns. As most of the principal natives were in the habit of trading with the ships, they

frequently recognised Mr. Lilley, and the inquiries they made dispelled the idea that we were going among an uncivilized people.

At 3 miles from the apex of the Delta we passed a tributary stream: Glasgow said it was navigable to a place called Abo, which we could reach by sunset. Near this, on the left bank, a farm belonging to one of Aqua's domestic slaves, Takoh Makumboh, struck us as being in a very favourable situation, for the bank is high, and the soil, though light, is apparently good: the neatness of the huts and the cultivation were remarkable. The opposite, or right bank, also became gradually more elevated.

About 3 miles further we arrived at what is called the shallowest part of the river: it was then a broad sheet of water (600 yards), though it just covers the sandbanks. However, in two moons, according to Glasgow's account, there would be plenty of water. He pointed to some grass at least 15 feet high, on the right bank, over which he said the canoes paddled with ease. At that time a great portion of the low lands must be under water. A little above this the river becomes much narrower, not being more than 350 yards, with a depth, though rarely, of 18 or 20 feet. The stream is in fact divided by the Wuri Island, which is also the commencement of the country of that name, in which a different dialect is spoken from that which is used by the Cameroons or Dualla nation lower down. The Wuri country is celebrated for its yams, which are taken down the river for sale. As evening was drawing on, and the current was strong against us, we made the best of our way to reach the town belonging to a friend of Mr. Lilley, where he proposed we should sleep. The news of our approach had been spread by King Bell and his men, who frequently stopped at the farms and villages, so that the banks were thronged with natives, who saluted us as we passed with deafening shouts, screams, and laughter; the women of course evincing the greatest surprise and delight at the novelty of our appearance.

With the exception of some little eminences of a friable sort of sandstone, the country appeared to be level. When the low lands are overflowed, the inhabitants are obliged to retreat to these higher grounds, which they reach in their canoes, paddling over their former plantations. They prepare for this periodical emergency by laying in a stock of smoked fish, and yams cut in slices and baked, which form a convenient provision for travelling. Thus provided, they live in temporary huts till the waters subside, and allow them to return to their former residences, to plant and reap till the next season.

At 5 P.M. we arrived at Bona-pia, the landing-place or wharf of a town called Andámako. Here we found King Bell and Beppo

waiting for us, having made up their minds not to go any further; and they used every argument to prevail on me to pass the night there, in which the chief of the town joined, with a very cordial invitation. I was, however, anxious to profit by the remaining daylight to reach the next town, as it would shorten our work for the following day. After a sufficient explanation, which was not, however, heard amidst the noise and squabbling, I pushed on to the town of Wana Makeinbi, which we reached at dark, but found that the chief—Mr. Lilley's friend—having been, it appears, summoned to a palaver at a town higher up the river, was absent, and that his people dared not entertain us in his absence. Bell was unwilling to land under these circumstances, as he said he could not be received in a manner becoming his dignity. We found him, however, enjoying the hospitality of the inferior people by drinking deeply of their palm wine. The sight of the miserable huts which we saw from the boat close to the muddy bank, and the attacks of myriads of mosquitoes and sand-flies, made me think better of Bell's advice, and regret not having accepted the invitation of the chief of Andámako. We knew not how we might fare if we tried for a lodging further up the river. My men were tired, having pulled without resting; and I was unwilling, by pushing them too hard on the first day, to weaken them for the second. King Bell, however, settled the matter by assuring me that there was no town, within two hours' pull, able to afford us decent accommodation. We therefore turned back, and glided rapidly down with the current, to Bona-pia, where we were received by King Bell and his friends, amid a storm of unintelligible welcome.

After the long confinement in a cramped position in the boat, we were glad to land; and having provided ourselves with such necessaries from our stores as might conduce in some degree to our comfort, where so little was to be expected, we began our march along a well-beaten path, at first abruptly rising from the bank of the river, and afterwards preserving a gradual ascent for about half a mile. The dew fell heavily; but, fatigued as we were, we could not but enjoy the gratification of stretching our limbs on terra firma. Overhead flitted numerous fire-flies, and every bush was illuminated by their brilliant coruscations. A few straggling roots across the path, which caused us now and then to stumble, were the only obstacles to our progress; and an easy walk of less than half an hour brought us to the residence of the chief or "gentleman" of Andámako.

An immense concourse of people awaited our arrival, and no sooner had we reached our destination than we found ourselves enclosed in a dense mass of men, women, and children. Even the branches of the old tree in the middle of the street and in



front of the chief's house, were loaded with dark urchins; yet, notwithstanding the novelty of the sight of Europeans in this inland African village, no annoying act nor insulting jest was indulged in at our expense.

When the ceremonial for our reception was prepared, the crowd gave way, and the chief—a powerful old man, whose grey wool 'told of many a scorching summer's sun'—came forward and conducted us to seats in front of his own door; a chair was placed for me in the middle, Mr. Lilley was provided with a stool on one side of me, and King Bell with one on the other; the rest of our party accommodated themselves very well on a long piece of timber at the head of the sable warriors forming our escort. By this arrangement we had the advantage of keeping the crowd in front and at a more convenient distance. The red glare of a lamp of palm-oil, fixed to the mud-wall behind us, played upon the moving mass of dark beings, making the deep shades of night still deeper in the background; and producing, by the lurid glow it shed on all in its immediate neighbourhood, a picture of the most unique description.

After waiting a considerable time—during which the good-natured people endeavoured to amuse us by playing tricks with a poor idiot—a substantial supper was served up on a long chest, the utility of which is undeniable, as, according to custom, after having had the custody of its owner's riches during his life, it is destined to be the depository of his mortal remains, when obliged, by the universal enemy, to relinquish his "grip on this world's gear." Whether this individual coffer had as yet figured in the capacity either of a treasury or a coffin, I do not know, but it served us equally well as a table. The supper was composed chiefly of stews of goat, mutton, fowls, plantains, yams, &c., some with palm-oil and some without, at my express desire; though I confess that the fresh pure oil—which is a constant ingredient in native cookery—is much more palatable than I had imagined; and it is said to be extremely wholesome. King Bell, though he took a glass of grog to keep us company, refused to sup until we had finished, out of compliment to white men; but when he began he rapidly made up for lost time, by a well directed attack on an ample calabash of stew, prepared for his especial appetite. In appeasing his hunger, however, he showed himself mindful of the wants of his watchful attendants, by pitching to them, ever and anon, a bone, or a morsel of meat, with his own royal hand. There was no unseemly scrambling for his majesty's favour, every one appeared to know for whom the mouthful was intended, by the direction it took in its flight over their heads.

Supper being ended, every thing was cleared away, and the

coffin was well garnished with *spirits* ; and, although we all felt weary and sleepy, we were obliged to submit to some potations and a long palaver on the subject of our visit in the river, and to listen patiently to the evidently much mutilated translation of the eloquence and lengthy arguments of the noisy council. At last, after an hour's hard battle—in words—between King Bell, the gentleman of the town, and one or two of the most notable wise-heads, it was resolved that a *fetiché* should determine whether it was proper that I should continue my voyage up the river or return by the way I had come, leaving my wishes entirely out of the question. The ceremony—over which I had no control to prevent or modify—having been duly performed, it appeared to be decided, without appeal, that my expedition was at an end. I modestly ventured to express an opposite determination, but, as I thought it the wiser course not to waste the precious hours of sleep in useless disputes, I deferred till the morrow should enable me to execute my purpose in despite of the *fetiché*. In the meantime, in order to divert their attention and cut short their arguments, I ordered a rocket to be fired, which had the desired effect of bewildering them between admiration and fear. After strolling up and down the clean street for some time to obtain a little fresh air, I turned into the chief's own hut, which had been vacated in my favour. Other huts were prepared for Mr. Lilley, Mr. Terry, and Mr. Sterling, though the two latter preferred sleeping in the tree. My hut was large and *apparently* clean, but it was in vain I tried to sleep, for the continual noise of the lingering gossips outside, the scampering of the rats overhead and all around me, the buzzing and tickling of myriads of sand-flies—though there were no mosquitoes—and the many salient points in the bamboo frame which,—covered by a mat,—formed my couch ; all these were sufficient inducements for me to lie awake, and long for the morning, to enable me to renew my voyage. When daylight at length arrived I proposed to Bell to start before the sun should attain power ; but he declared that his people could not pull without breakfast, and the preparation of this meal was delayed by a variety of untoward circumstances ; among which, not the least important was the perversity of the devoted goat, who required to be caught three or four times before he would allow himself to be killed, skinned, and stewed ; so that by the time this very important affair was dispatched, and we had taken leave of our kind host, it was 9 o'clock.

On our way down to the boat we were met by a great number of men armed with muskets, who saluted me very civilly in passing ; but previous to our embarkation they surrounded Mr. Lilley and King Bell, and engaged them in an animated discussion on the subject of our further advance. At times the palaver seemed



to go on smoothly enough, at others the interlocutors broke out into passionate exclamation and the wildest gestures, which, being simultaneous on the part of the natives, showed them to be unanimous in their unseasonable stipulations. My fears for Mr. Lilley's safety were allayed by his perfectly composed demeanour, as he stood in the centre of this apparently angry group. When he came into the boat he explained, that these people had come from the towns above to inform me that, if we proceeded on our voyage, we should meet with a very bad and savage set of men, from whom our lives would be in the greatest danger. The orator added, that since the white men had come to their country they considered their honour pledged for our safety, and therefore they could not suffer us to expose ourselves to such peril; but that if we were obstinate, and would not take the warning of our best and warmest friends, they would be reduced to the disagreeable necessity of shooting us themselves, in order to save us and them from the disgrace and mortification of being killed by bushmen.

I knew the sum and substance of all this to be that they were jealous of our becoming acquainted with the river; and feared if they allowed us to penetrate beyond their territories, that their neighbours would participate in the advantages of intercourse with the white men. It was evident that if they were fully bent on carrying their *merciful* intentions into effect, I had not sufficient means to justify my obstinacy. However I thought it better to treat the affair in a cavalier manner, so I laughed at their fears for our safety, and said that my present intention was only to go as far as the upper end of Wuri Island, which I was resolved to do, but that I might possibly return with the *fire-ship*, and then I would see who would dare to stop a white man and the Queen of England's ship. The men on the bank then gave three loud shouts, whether in acquiescence, or defiance, I did not know; but they suffered us to proceed unmolested. The men on the bank of Wuri Island participated in the anxiety about our intentions, and all asked if we were going to the Budiman's country. Some seemed satisfied with our answer, others endeavoured to stop us by remonstrances and angry gesticulation. I was much amused by the nonchalance of our pilot Glasgow, who steered us steadily on our course, without condescending to repeat his answers.

Wuri island is about  $5\frac{1}{2}$  miles in length by about 3 wide. It is beautifully wooded with a great variety of trees, among which the magnificent bombax stands the monarch of them all. The banks are steep and high on the immediate border of the river, but the ground within is very low and swampy. This enables the natives to catch fish in a very simple manner, by cutting wide trenches through the bank, so that when the water rises in the



river it flows by these channels to the low ground behind, forming large basins, into which great quantities of fish find their way, and are retained by means of sluices. When the river falls the water is let off again, a net having been previously placed across the aperture, by which means the exit of the fish is effectually prevented. Another method of fishing is practised on this river, as well as on the lower Niger. A large wicker enclosure is formed closed to the bank, having a sliding door at the outer side, and a bait within. A person watches from a stage or little hut built close to the basket or enclosure, and when he sees that a fish has entered and is fairly engaged with the bait he lets fall the sliding door and prevents the retreat of his victim.

The island appeared to be very thickly peopled, but only on the banks. The huts formed a continuous town for nearly half of its circuit at the upper end. The people gathered in crowds at every landing-place, inviting us to land; and the young women and children ran along the bank abreast of us for a great distance. We noticed some girls who were beautifully formed—the graceful action of their limbs in running being unimpeded by any garments; though they appeared to appreciate the value of ornament, from the tasteful way in which their heads were dressed with large beads, &c. On reaching the upper end of Wuri Island we turned into the Ebonjeh Creek, which separates it from the main land on the left bank. This creek or branch is much narrower than the other. The banks were here also crowded with people, who ran along shouting and waving us to land. Passing rapidly down with the current, we soon rejoined the main stream.

The pilot having assured me that the town of Abo, at the source of the little affluent we had passed in going up,—the Yabiàng river,—was at a distance of only about 6 hours, and navigable for canoes, I determined on exploring it. We had the benefit of a little flood tide. The stream is much narrower than the other, being only about 120 yards wide; and at 6 miles it is divided by a low woody island. We were obliged to take the narrower channel, the other being blocked up by large trees thrown across to impede the navigation of hostile canoes. Our branch was so narrow that in some places oars would have touched the branches of the trees on either side, which however stretch out a very considerable distance from the bank. It was also full of snags, or trunks of trees, against one of which we struck violently, and I thought we had knocked a hole in the bottom of the boat, as the water was rushing in very fast, but it proved to be only the plug knocked out. The smell in this creek was very offensive from the quantity of decayed vegetable matter on the banks, which in some places were very thickly matted with creeping plants; these afford hiding places for canoes, which are drawn into a leafy cavern by a small aper-

ture among the tangle, like the opening to a nest. We were very glad to get to the main stream, above the island; but had not proceeded far, when a heavy shower of rain obliged us to take shelter in a hut at the foot of a hill. As there appeared to be little chance of its clearing up, I sent to reconnoitre a village called Kokki, which Glasgow said was at a short distance, and having ascertained that we could be accommodated, I resolved on passing the night there, with the view of proceeding to Abo in the morning, if possible.

The walk up the gentle hill to the village was through a beautiful and well-cultivated country, in which partial clearings had left magnificent clumps of trees. We found the chief in great distress at the loss of his wife, who died that morning while he was out shooting. I saw a very large antelope which he had brought in. In the intervals of his howling he drove a hard bargain with me for the hoofs and horns, which were all that I could prevail on him to part with.

The village was like the others, composed of neat huts on either side of a tolerably wide and straight street, which had also the merit of being clean swept. The cook-houses were all detached, and, being open at the side, we preferred sleeping in them, to the confinement of the close huts; and we should have probably enjoyed a good night's rest, after a substantial supper which was prepared for us, if it had not been for the incessant howling of the women, who held a wake over the dead body of the chief's wife.

The morning proved very cold and foggy, and as the river had become very narrow, with rank vegetation on its banks, from which a noxious vapour was rising, I would not venture any further, but returned towards the Wilberforce. The town Abo, which I wished to have reached, was said to be about 4 hours higher up, and to be situated near some rocks, over which the river Yabiàng falls about 50 feet, as well as I could understand from the imperfect description of the natives. At the distance of 4 hours overland, W.N.W., I was told there is a mountain, called Wah-paki, with a town of the same name.\* A man overtook us in a canoe, with a message from the chief of that town, who wished us to pay him a visit; he said that he had started before "the first cock speak"—i. e. before daylight—which agrees in distance with the account given us at Kokki. The messenger pressed me to return, as he said his master would be much disappointed at the white man coming so near his town without visiting him. I sent

\* This is doubtless a part of the Cameroons mountains, as I was told at Bimbila of one of a similar name at the back of Mongo-ma-Lobah.

him, however, a small present, which was the principal object of his solicitude, and the messenger went away quite contented.

We rapidly descended the river—passing through Jibareh Creek, which we had in vain attempted to go through in the steamer—and reached the Wilberforce at ten in the morning.

Although, on this little voyage, we did not reach a greater distance from the sea than 40 miles, the object I had in view was attained—viz., to ascertain the nature and magnitude of the river by reaching the main undivided trunk, which is only 8 miles above Bell's Town, and less than 20 from the sea. Indeed the real left bank of the river comes down as far as that settlement, which is on an elevation of 50 feet above the river. I hoped to have been able to make a good set of magnetic observations on this bank, but I found them full of discrepancies—accounted for by its geological structure, which is thus described by Mr. Roscher, geologist to the expedition:—

“The bank consists of a recent conglomerate, containing particles of quartz of the size of a walnut, small white fragments of mica, and masses of reddish sandstone, some of which measured four feet. The whole is combined by a light-brown clay. The stratification is horizontal, and the thickness of the beds varies from a few inches to several feet. I could not detect any organic remains in them. The fragments of sandstone, which constitute part of the conglomerate, are composed of particles of quartz combined by oxide of iron, or by the adhesion of their own particles. Sometimes the iron ore is combined chemically with clayey matter, forming compact masses.”

The influence of the iron on the magnetic needle would be stronger at the base of the cliff, where the sandstone is compact, and appears to contain a large quantity of the metal. Still I found it to be so great at the surface that it produced different results in the inclination, in observations taken only a few yards apart.

The opposite bank has a ledge of rocks, visible at low water, corresponding with the compact sandstone at the base of the cliffs, which would lead to the supposition that the original banks of the river reached as low as this on both sides. It is now, however, low and covered with mangrove-trees; as are all the islands within 25 miles of the sea. They appear indeed to be in process of forming a little delta, which may fill up the estuary, and thus regain from the encroachments of the sea what may have been submerged by some convulsion, caused by the volcanic agency of the neighbouring mountain range.

The fine estuary of the Cameroons is the common receptacle of several streams. It owes its name to the Portuguese, who



called the extreme point Cape Cameroons, from the vast quantities of small shrimps found there. This name has been extended to the principal river which falls into it, but the natives, as is usually the case, give it the name of the countries through which it flows. Thus at Bell's town it is called the Mādiba ma Dualla. Higher up it is Mādiba ma Wuri, &c. Although it is a beautiful river, it is not to be compared with the Niger. Its average breadth above the mangroves is about 400 yards, as far as I reached. In the dry season, this portion of the river varies in depth from 2 to 20 feet, though we had rarely more than 8 feet; but when flooded, there would be water enough for vessels of any draught. From the accounts, however, of several intelligent natives, the navigation is obstructed by rocks at Banem, about 50 miles from the furthest point which I reached, or 90 miles from the sea; but beyond these rocks the river "goes on" for many days, according to my pilot, though he could give me no further account of it.

The Cameroons river has two tributaries on the right bank: one—the Yabjäng—which I explored a little way, and another about 25 miles above Wana Makembi's town. They are both said to have their source in, or to fall over, rocks about 50 feet high. There is also a small stream which falls into Ebonjeh creek, coming from Duka-bakin, about 4 hours up it.

It had been supposed, that besides the so-called Cameroons, a large river fell into this estuary called the Malimba; but all persons agreed in telling me that this is but a divergent creek from the Qua-Qua river, which comes from the eastward. My pilot Glasgow said, that this river has more mangroves, but that it is of less magnitude than the Wuri or Dualla. It is also obstructed by rocks at about the same distance from the sea. He said the king of all the Qua-Qua country resides at a place about 80 miles up the river, called Longassi.

Thus it would appear from all the accounts I received, that there is a range of hills extending from the Cameroons mountains to the eastward, or that there is a high table-land at about 100 miles from the sea, since the natives said of the four streams, that they all fall over rocks, about 50 feet high according to some. Circumstances prevented my exploring the Qua-Qua river; nor could I make much addition to Captain Vidal's survey of the estuary. I however surveyed the Dualla from Bell's town downwards, and connected it with that officer's work. In this operation I derived considerable advantage from two palm-oil vessels, which were dropping down at the same time, and one of which Mr. Lilley kindly ordered to be anchored in suitable positions. Besides the two rivers I have mentioned,—the Dualla and the Qua-Qua,—some creeks empty themselves into the estuary, viz., the Bômano,

Mongo, and Bimbia, which are merely the drains of the high mountain range bounding the western side of the estuary.

With one exception, all the natives declared that there is no water communication from the estuary of the Cameroons, round the mountain, to the Rio del Rey, or Rumby river. Young Nako alone said, "If you slave for twenty days in a canoe, you can go round to Balondo on the Rumby river;" but, on confronting him with all the principal traders, he acknowledged that being a "little boy"—about twenty-five years old—he could not speak from experience, he had only heard it from others. These traders, chief men, all declared that the water stops at Balung, about 30 miles up the Bimbia river, where there are high hills, rocks, and springs of water. There are many elephants in the woods. The Mongo and Balung people go over the hills, by way of Ekombah and Ebonjeh, to Balondo, on the Rumby river; or, by taking another road from Ebonjeh, to Bamboko, on the western base of the mountain. The communication, however, is very difficult, on account of the hilly and woody nature of the country; and it must be lofty, as they said it was very cold. I was told that the Rumby river terminates at Balondo.

Although Mr. Lilley, who had nine years' experience, declared the Cameroons river to be healthy, some slight symptoms of fever, which appeared on board the *Wilberforce*, induced me to hasten to the bay of Amboises, where all soon recovered. We had there, also, the advantage of a good supply of fresh provisions, which could not be procured at Cameroons, nor at Fernando Po. The instructions from the Admiralty, and a favourable opinion which I entertained of the salubrity of this bay, led me to examine it with some care.

It is situated at the base of a lofty mountain, 13,000 feet, commonly called the Cameroons in our charts, but which Mr. John Grazillier, who made a voyage to Old Kalabar in 1699,\* says was called by the Portuguese the *Tierra Alta de Ambozes*. The islands lying in the bay, he says, were named by them *Ilhas Ambozes*, by the English *Amboises*, and by the French *Amboizes*. The only resemblance to this I found in the native name of the outer island, which they call *Ambas* or *Dameli*.

The native name for the highest part of the mountain is *Mongo ma Lobah*, but at the back or inland it is called *Mokoli ma Pako*. The isolated peak near the bay, about 5000 feet high, is *Mongo m' Eündeli*. Although at a distance this noble mountain appears to rise by a continuous slope from the sea, on a closer view it is found to consist of a succession of hills with intervening valleys of

\* Astley's *Voyages*, vol. iii. p. 119.

the richest soil, covered to within a third of the summit by beautiful forest-trees, which are also seen fringing the ravines still nearer to the summit. The remainder is clothed with grass, which becomes more scanty—as the colour which approaches the reddish brown of volcanic ashes near the cone sufficiently indicates. The volcanic origin of the whole of this district is strongly marked by the scorix and numerous streams of lava which have reached the sea. From the present condition of its surface, it must have been for ages in a state of repose; though there is reason to think it sometimes betrays its latent fires. Mr. Lilley assured me that he had seen flame near the summit. This might have been accounted for by the practice of the natives, who set fire to the grass in the dry season for the purpose of catching wild animals, which they call “bush-meat;” but several of the principal natives of Bimbia declared, that about three years previous to my visit, that is, about the year 1838, “fire came out of the ground;” they said, “God made it,” in contradistinction from that caused by the burning of the grass. “They all saw it, and at Mongo they felt the earth shake like a steamboat.” “The people there feared it would kill them all.” This, coupled with the name of the mountain,—Mongo ma Lobah, or God’s mountain,—might be a fair reason for supposing this to be the chariot of the gods of Hanno, the Carthaginian. He says, “We discovered at night a country full of fire. In the middle was a lofty fire, larger than the rest, which seemed to touch the stars. When day came we discovered it to be a large hill, called the Chariot of the Gods.”

To judge by the grey curling smoke issuing from many parts of the woods for a great distance up the mountain, it must have a large population. Along the sea-shore there are many villages, some of which I visited; and, though the natives were described by Brazilbier as “the worst blacks of all Guinea,” I found them very civil. In his time they had a little trade in slaves, chiefly with the Dutch. They now have intercourse only with the Bimbia people, whom they supply in a great measure with plantains.

The base of the mountain to the westward of Mongo m’ Etindeh is called Bamboko, that part to the southward Bakwileh, and behind Bimbia, at the eastern part of the mountain, it is called Batongo.

At Bimbia there are numerous villages built on a beautiful amphitheatre of rocky ground; the inlet is sheltered by a small island, and would be an excellent anchorage for ships trading in palm-oil, but it is very hot, and the land-winds blow over the swamps of the estuary. The inhabitants are actively engaged in collecting palm-oil, of which they told me they had a large quantity, and were anxiously looking for some white traders to take it



off their hands. They, as well as the natives of the islands in the bay, are of the Dualla nation, while those of the base of the mountain are of a different race, and are called by their more civilized neighbours "bushmen."

There are in the bay of Amboises three small islands, the size and capabilities of which are in inverse ratio to their population. The largest—Mondoleh—only half a mile long, situated at the S.E. part of the bay, is high and rocky, but with a level surface of the richest soil imaginable, of decomposed basalt, and the steep sides are clothed with beautiful wood. There are at present only ten men with their wives and families on it, though, if well cultivated, it would afford subsistence for probably five times as many. There are three or four springs of water half way up the side of the island, which, though scanty, are said to be always flowing. The landing is bad, but might be improved.

The outer island, Damèh, or Ambàs, is smaller, and nearly barren: the rocky slopes and summits only, are clothed with a little brushwood and grass. It is, in fact, a narrow ridge of rock, elevated at the outer extremity; but although nature has here provided no means of subsistence, about 300 or 400 people have made it their home. They exchange the abundant produce of the sea, with the natives of the mainland, for plantains and yams. They have also a good stock of goats and pigs, which feed on the precipitous sides of the island. The only place at which boats can land is difficult, on account of the rugged rocks and incessant swell. With very little trouble, however, a good pier might be made. There is only one scanty spring, which indeed was dry when I saw it—unless I was misled: the inhabitants are therefore obliged to catch rain-water, and in the dry season they must get supplies from the mainland.

The island Bobia, called also the Pirate Isle, from the *supposed* predatory disposition of the natives, is more barren even than Damèh. It is a mere wreck of a larger island, as the numerous isolated fragments, perforated by the sea, and lying in its vicinity, bear witness of its having been formerly much more extensive.

It is probable that it once joined the adjacent perpendicular cliff on the mainland, as the structure is similar, and between them there is but a narrow and shallow channel. The promontory may even have extended to Damèh, with which it is in a line. The progress of destruction is still going on, as enormous fragments of rock are lying at the N. end of the island, which I believe to have fallen since my visit in 1833. Although this is much smaller than the other two islands it is swarming with people, almost every available spot on its rugged surface being occupied by a hut. It is perpendicular on all sides, and the only access to the summit is by clambering up what appears to be the

projection of a basaltic dike—a fearful path, passable for only one at a time, and which might be defended by a child. The inhabitants probably owe to their impregnable position the bad character they have among their neighbours. They are a ferocious looking though a shy race, but I never heard of any well authenticated charge of piracy against them. More correctly speaking, their secure position has probably engendered a spirit of independence, and a determination to resist oppression. The chief of Bimbia complained to me that they would not acknowledge his authority, nor comply with demands which I found were not so just as he alleged. These islanders are the principal fishermen of the bay, which in fine weather they cover with their light canoes. This enables them to obtain by barter from the mainland—with which they are in constant communication—the scanty clothing they require, and supplies of plantains, yams, &c.

They were at first very much alarmed at our appearance, believing that we were come to put in execution the threats of King William of Bimbia; but we soon became on better terms, and I landed several times, and climbed up to their curious village. At the summit of the path the island ridge is not, I think, 10 feet across.

The anchorage is excellent in all parts of the bay, as to holding ground and depth; and although it is a lee shore, and there is an incessant swell, I believe it never blows home here so as to endanger ships, and the landing is not so bad as at Ascension. The prevalent wind is S.W., to which the bay is quite open; and the worst months are, I believe, July and August, but there is shelter behind the island Mondoleh. Wood, vegetables, and live stock, may be had in abundance; the latter at a fourth of the price demanded at Fernando Po. Excellent water can also be had near Kieh, but only at low tide, as the water gushes out at the foot of a rock. By excavating, however, above high-water mark, a very convenient watering-place might be made. The disadvantage of being a lee shore is amply compensated by the purity of the sea breeze, which blows across the Atlantic. The adjacent mainland, too, is nearly devoid of mangroves and swamps; and as the land wind passes over the lofty mountain it is rendered cool and refreshing. Indeed, from the peculiarity of its situation, and from local circumstances, I think that the Bay of Amboises will be found to be the most healthy position on the coast of Africa. Although my visits were during part of the rainy season, we seldom had more than a shower or a tornado about once in twenty-four hours. The rest of the day the weather was very beautiful, and we were some days without rain.

II.—*Visit to the Sources of the Takutu, in British Guiana, in the year 1842.* By ROBERT SCHOMBURGK, K.R.E. [Communicated from the Colonial Office.]

VARIOUS circumstances delayed the departure of the expedition from George Town; additional impediments occurred at Pirara; so that the month of March had approached, or, in other words, the dry season had fully set in before it could start. It was impossible at this advanced season to pursue my first plan of ascending the river Cotinga, in order to reach the culminating point of the system of mountains called Pacaraima\* by recent geographers, which, in connexion with the Parima mountains of the Orinoco, form the water-shed between the affluents of that river and those of the Essequibo and the Amazon. I selected, therefore, the river Takutu for our exploration. According to the information which I had collected from Von Martin's and Humboldt's works, it appeared no easy task.

A promise had been made to me to send a canoe to the mouth of the Pirara to transport the most indispensable instruments; but several weeks elapsed and there was no word of its arrival. I was aware that if my plan of tracing the Takutu to its source was to be executed before the setting in of the tropical winter, or the great rainy season, no time was to be lost. I engaged therefore a number of Macusi Indians to accompany us as carriers and guides, and set out for the mouth of the Pirara on the 24th of March. My party consisted of Mr. Fryer, acting as assistant surveyor; Mr. Goodall, the draughtsman; Mr. Richard Schomburgk, who, at the request of the Prussian government, had been allowed to accompany the expedition in order to make collections for the Royal Prussian Museum and the Botanical Garden at Berlin; and nine canoe-men, partly Europeans, who were permanently engaged; Sororeng, who accompanied me in 1839 to London, was, as on former occasions, our interpreter.

There was something interesting in our departure from the village, which had been our head-quarters for almost two months. All was bustle; the Indians fixed their burdens, which in no instance ought to be heavier than 30 lbs. Women and children took leave; and the canine race, far too important to be overlooked on such an occasion, showed by their loud barking their belief that they were to be of the party. It had, however, been differently decreed by their owners; and the shrill voice of the squaw was heard above all recalling the dogs, which in spite of cudgel and throwing of stones, try to outflank her and join the travellers.

\* Humboldt's Narrative, vol. v. pp. 797, 841, 857; vol. vi. p. 514.



By  
Robt H. Schenck, R.R.  
May 1892.





We followed the small path one by one in Indian file, and soon stood at the ford of the Pirara, where the river issues from the lake. The water at that time scarcely reached our knees.

We selected a different path from the one I had followed on a former occasion, and passed the small lake Ventura, now almost dry, but nevertheless frequented by numerous *vicissi* (*Dendrocygna viduata*) and Muscovy ducks, which, disturbed by our approach, rose from their feeding place, and encircled the small basin of water in rapid flight. Were it not for the two mountain chains, Canuku and Paruma, which at the distance of 20 miles bound the view to the S. and N., the march across the savannahs would be monotonous in the extreme. During the dry season no bird, scarcely an insect, enlivens the scene; a few stunted shrubs, almost leafless, and some grass scantily cover the savannahs; the reddish soil, in consequence of the strong E. wind, and want of moisture, gapes in numerous crevices; clouds of dust raised by the strong breeze ascend the air in columns, envelope the traveller incessantly, and almost blind those who are not on their guard against the small particles entering their eyes. At noon the heat rises on these savannahs to 120° and 125° Fabr. in the sun. The *mirage* plays upon their surface, and in the distant horizon the trees and other objects appear to hover in the air. We were glad when (soon after 3 p.m.) we struck the river Pirara, and were able to quench our thirst. We had marched 11 or 12 miles without finding any palatable water. The best of our pedestrians reached the mouth of the river at five o'clock that afternoon; some did not come up till next morning. It is a distance of 17 English miles from Pirara, by no means an easy march under the tropics.

We encamped near the junction of the Pirara with the Mahu. Two small corials which we procured required a thorough repair to fit them for use; and, besides, a delay of at least three days was required to observe what effects the journey over the savannahs had produced upon the chronometer.\*

*March 27th.*—A serious accident which occurred to-day impressed the superstitious crew with an idea that the expedition would be an unfortunate one. Two of the canoe-men (Europeans) went out to shoot for their own amusement, without requesting permission to leave the camp. On their return the gun of one of them, Petry by name, got entangled in some withes, and he dragging it forcibly towards him, the cock of the percussion-lock was raised, and the gun went off, lodging the whole charge in his back below the shoulder-blade.

\* The Chronometers—Frodsham, 389—Arnold, 6062—were carried by one of the most careful of our canoe-men in a small tin casket, which he slung by a strap across his shoulder.



This unfortunate accident detained us till Saturday the 2nd of April, when, by advice of Mr. Fryer, Petry was carried upon a stretcher to Pirara.

The longitude of our camp was, according to the two chronometers,  $15^{\circ} 3''$  (in arc) W. of the village of Pirara. The longitude of the village of Pirara not having been satisfactorily determined as yet, I have adopted it as the first meridian of the survey. On my previous expedition under the Royal Geographical Society, the chronometers which I had with me gave 14 miles W.; I have more confidence in the present result—

Arnold 6062 gives  $59''\cdot50$  (in time) W. of Pirara.

Frodsham 389 „  $1^{\circ} 0''\cdot88$  „ „

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Difference . .  $1''\cdot38$

In order to employ the time which the accident caused us to remain at the mouth of the Pirara in the most useful manner, I ascertained the distance of some of the most remarkable mountains in the Canuku and Pacaraima chain visible from the camp, while the men were busy repairing the corials and strengthening them by additional knees. A tree of the natural order of Dilleniaceæ, the *Curatella Americana*, furnished us natural knees for this purpose. It is almost the only tree that is to be found upon the savannahs. It is stunted in its growth, and its branches are so crooked that besides knees for boat-building, it might be used for military saddles; its leaves are rough and scabrous, and the Indian uses them as our tradesmen would employ sand-paper—to polish his blow-pipe (cura), bow, war-club, &c. The tree is called, from its being used in polished the cura, 'curata-kie.'

On the margin of the Pirara, a *Eugenia* attracted my attention, with fruit as large as a damson. This species appears to produce a larger fruit than any other of this extensive genus. I observed two varieties—one purple, the other yellowish with a red spot. It has an agreeable acid; and the Macusi Indians, who mix it with their drink, call it *Casani*.

The heat was extreme during the time that we remained encamped near the mouth of the Pirara. Although the thermometer was placed under the tent, which was surrounded by shadowy trees, it rose, between two and three in the afternoon, from  $97^{\circ}$  to  $100^{\circ}$  Fahr.; its lowest stand at six o'clock in the morning was  $73^{\circ}$ . Our trigonometrical operations on the savannahs were therefore extremely fatiguing. A delicious refreshment was found on some spots of the savannahs which were covered with a small plant (*Psidium turbiniflorum*, Mart.) the berries of which had the aromatic flavour of strawberries. We did not spare the fruit whenever we fell in with it the Macusi Indians call it *Piriko*.

Another species of a larger size, and approaching in its appearance to the guava (*Psidium pomiferum*) only that the shrub is scarcely above 3 or 4 feet in height, is called Canung. I was rather astonished to hear so far inland the larger shriek, which is so common near the coast, that whoever has visited George Town will seldom forget its incessant cry, approaching in sound to "qu'est-ce-que-dit," from which the bird has received its trivial name. It is probably the *Psaris Cayanus* (Cuv.); and our Macusi called it from its cry "Setté-qui."\*

*April 2nd.*—Mr. Fryer set out with Petry to Pirara, with directions to remain in attendance on him till he was out of danger. This deprived me of the only assistant in my manifold occupations; but I was too well aware that without some surgical assistance Petry would have little chance of recovery.

The men had repaired three small corials, which, though they afforded room for only two or three persons each, were calculated to convey my instruments more safely than the Indians could carry them. I had restricted myself to the most indispensable:—a sextant, by Jones; an artificial horizon; a new telescope, by Troughton and Simms; a prismatic compass; an horizon with levelling screws; Hansteen's apparatus, with two horizontal needles, which Colonel Sabine kindly lent to me;† a chain of 100 feet, divided in decimals, and compared with a standard chain by Troughton and Simms; three thermometers, by Troughton and Simms, compared with the standard; two pocket chronometers—Frodsham, No. 389, and Arnold, No. 6062.‡

These instruments having been embarked in the canoes, which were entrusted to the guidance of the coxswain, we forded the

\* MEAN OF THERMOMETRICAL OBSERVATIONS NEAR THE MOUTH OF THE PIRARA.

Period, 1842.	6 A.M.	9 A.M.	12 A.M.	3 P.M.	6 P.M.	Max.	Minim.
March 27th to April 2nd	75.72	83.13	91.62	94.92	86.07	98.	73.

The thermometer had been compared with an excellent standard thermometer of Troughton and Simms. A strong easterly wind blows generally from sunrise to eight or ten in the evening.

† They are the needles L (a) and L (b) mentioned in Table LII. of the Magnetic Survey of Great Britain.

‡ Knowing from experience how easily the mountain barometer is put out of order during an overland journey, and desirous to be able to carry this instrument on my next expedition to Romama, I left it in Pirara. This precaution was unavailing, although great care had been taken in putting it up; Mr. Fryer, entering the house one day, which during my absence had been unoccupied, found the instrument upset and broken. Fortunately a barometer by Bunsen, No. 430, compared with the barometer of the Royal Observatory at Paris, and that of the Royal Society in London, remained in good order.

Pirara, and continued our march to the junction of the Mahu with the Takutu over savannahs as monotonous as those I have previously described.

The Takutu, like other rivers which flow through the savannahs, is fringed with trees which show a more luxuriant vegetation than the generality of the vegetable productions on these plains. The wood through which we had to pass before we reached the river, was nearly a mile in breadth, interspersed with high trees, and an arborescent shrub, which, like the mangrove (*Rhizophora*) of the sea-shore, had taken root in the alluvial soil, and formed dense thickets almost down to the verge of the river. Its branches, like those of the celebrated banyan-tree, throw down roots into the soil, and form in vegetable arches, which scarcely admit the sun's rays, and under which we passed, as if under the dubious light of an early misty morning. The large trees belonged mostly to the genera *Cordia*ceæ, *Malpighia*ceæ, and *Mimosa*ceæ. The first was the *Cordia tetraphylla* of Aublet, the table-tree of the colonists. The second was a *Malpighia*, a tree of considerable height and extent. Its berries, of a deep orange, were ripe, and a great number lying on the ground. Our Indians eagerly collected and ate them, apparently with much relish, although to our palates they appeared austere. The handsomest tree, however, was a *Mimosa*. Its trunk was of a light ash-grey, its branches spread to a great extent, and its fine pinnated foliage, of a vivid green, added to its remarkable appearance.\* A *Loranthus*, with bright scarlet flowers, covered a great many of the trees near the mouth of the river, and presented a strong contrast with the white flowering *Desmanthus*.

A site for our camp was selected on the left bank of the Mahu, at its junction with the Takutu. I have elsewhere observed † that the Takutu appears more like a tributary of the Mahu than the recipient of the latter, and in reality its breadth is less. A trigonometrical measurement in 1838 gave me for the width of the Takutu 192 yards before it receives the Mahu, and the latter was found to be 263 yards wide at its mouth.

As I had not previously determined the latitude of the junction of these two rivers, I determined to do so now by astronomical observations. We remained, therefore, several days in this camp. The sky was much overcast at night; hour-angles in the morning, however, gave me as difference of longitude between Pirara and the confluence of the Mahu and Takutu 1 m. 36.41 s. W. in time. The latitude is 3° 35' 8" N.‡ That beautiful constel-

\* I am not acquainted with the botanical name of this tree, of which there are no specimens among my former collections: it had neither blossom nor fruit when we visited the Takutu.

† *Journal of the Royal Geographical Society*, vol. x.

‡ This is merely approximate; I have not yet had time to calculate the mean of



lation, the Southern Cross, afforded me the best opportunity for circum-meridian altitudes.

The very natives have been struck by this constellation; and the Macusi Indian dedicates it to the Spirit of the Savannah. He asserts that when the cross stands erect, the Pauitima (Powis, *Ourux erythorynchus*\*) commences its low moan. On a previous occasion I had ascertained the truth of this assertion, when the Southern Cross was on the meridian at four o'clock in the morning; but as this is nearly the hour when that bird commences its booming (to use a word nearly approaching in sound to its moan), I laid at that time little stress on the circumstance. The banks of the Takutu are famed for the number of the savannah powis, and I had here a second opportunity of ascertaining that there is some truth in the Indian's assertion. On the 4th of April, 1842, when I was taking circum-meridian altitudes of  $\alpha$  Crucis, the bird commenced its solemn moan, which lasted about a quarter of an hour. The star was on the meridian that day at 23 min. past 11 P.M., by no means an usual hour for the powis to be heard; the coincidence, therefore, was the more remarkable. The draughtsman of the expedition, who noted the time of my altitudes, and to whom I had some days previously related the information I had received from the Indians, was equally astonished at the strange coincidence.

The Takutu had dwindled to a small rivulet near its mouth; its waters, of a light bluish cast, appeared in many places almost stagnant. The Mahu offered quite a different appearance. Although lower than it generally is, it pushed its mass of dark brown water far beyond the junction with the Takutu.

Our Indians amused themselves with wading to the opposite shore. We ourselves enjoyed the bath, though apprehensive on account of the ravenous Pirai (*Serrasalmo niger*†), and its numerous congeners, among which the *S. piranka* is perhaps the most dangerous. Our Indians proved that these fish were numerous by catching a great many with the hook and line. Another fish, which was equally plentiful at the mouth of the Takutu, was the *Pimelodus insignis*,‡ so remarkable for its second dorsal fin, which occupies in length nearly the whole space between the first dorsal and the tail.

The sky was generally clouded during our sojourn at the confluence of the Mahu and Takutu, and a fresh easterly breeze also contributed to lessen in a great measure the heat which we should

upwards of one hundred circum-meridian altitudes of north and south stars. The longitude is the mean of the longitudes given by the two chronometers.

\* *Animals in Menageries*, by Mrs. Swainson. London, 1838; p. 157.

† *Naturalist's Library: Natural History of the Fishes of Guiana*, part i. p. 225, plate 18.

‡ *Ibid.*, 180, plate 6.

otherwise have felt—the more on account of an extensive sand-bank 2600 feet long, which in that dry season bordered on the site of our camp.\*

6th.—The instruments and other packages which could conveniently find place in the small boats having been embarked, we commenced the ascent of the Takutu. The first day I preferred walking in company with the Indians along the shore. Mr. Goodall, the artist, and Mr. Richard Schomburgk went in two of the small canoes. The corials ascended slowly, and we pedestrians soon outwalked them.

At the ford which the Brazilians of the Rio Branco generally make use of in crossing the Takutu, we waded to the left bank of the river, fringed with underbrush, bamboo (called rapau in the Macusi language), and a few trees of the same description as those I have already mentioned, the Sawarai palm (*Astrocaryon lauari*, *Mart.*) occupied whole tracts among these thickets, and we had to guard ourselves against its large black prickles. We kept along the outskirts of these thickets, and found it by no means an easy matter to push our way forwards through grass of a man's height, and swamps which, although dry at the time, offered by their rank vegetation every obstacle to our progress. These spots are overgrown with numerous *Mauritia* palms, and our Indians profited by this opportunity to provide themselves with new sandals.

The *Mauritia* palm, or Ita of the colonist (*Mauritia flexuosa*), is one of the most useful among the interesting order which Linnaeus has so appropriately called "the princes of the vegetable kingdom." There is scarcely any part of this majestic tree that is not made use of for domestic purposes; we need not wonder, therefore, that Father Cumilla, the illustrator of the Orinoco, calls this beautiful palm "*Arbol de la Vida*." Its leaves, folded like a fan, furnish thatch; the fibres, thread to weave hammocks and make cordage; the trunk, a kind of sago, which the Warrau Indians make use of in time of scarcity; at certain seasons the Indians of the savannahs, and the Warrau of the Orinoco, draw from it a liquor of vinous taste, which when fermented is intoxi-

\* MEAN OF THERMOMETRICAL OBSERVATIONS AT THE MOUTH OF THE MABU.

Period 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	4 hour.	
April 2nd to 5th	72.50	80.12	89.12	80.43	82.50	Except some slight, drizzling showers, there was no rain.

cating. The fruit, which is tessellated, is of a dark brown on the outside, and when arrived at maturity, yellow within.

The Indians immerse this fruit in water until the yellow heart becomes soft, when it is considered fit to eat; and Europeans, though they dislike it at first, soon acquire a taste for it. The deer of the savannah, the peccary monkeys, agutis, parrots, all appear equally fond of this fruit; and the heavy tapir, on its way to its feeding-place, forms numerous paths through the rank vegetation of any swamp where there is an Ita palm with ripe fruit, which one unacquainted with the fact would imagine to have been made by human feet.

The savannahs between the Rupununi and Rio Branco are covered with numerous angular quartz rocks, and it would be painful to walk with unprotected feet over such places. The Indians, therefore, use sandals (*salza* in Macusi) made of the half-sheathing bases of the Ita-leaves, which are better suited for this purpose than those of any other palm. They are fastened in a fashion not much different from that of the ancients, and a pair of these sandals last at least a few days' journey over these rocky plains.

Even in its decay the Ita is of some use. When its trunk lies prostrate on the ground a large beetle (the *Calandra palmarum*) deposits its larvæ in it, which are considered a great delicacy not only by the Indians but likewise by many Europeans, especially by the French in Cayenne, Martinique, and Guadeloupe. The Indians frequently fell these palms, and, having cut several holes in the trunk, are sure to find numerous larvæ of the *Calandra* there in due time. I must not omit to mention that the Indians prepare a kind of salt from the ashes of the burnt leaves.

The Mauritas grow only in moist soil or swamps, and when we failed to procure water by digging at the foot of their trunks, we knew that our search would prove hopeless anywhere else in the neighbourhood.

We continued to follow the narrow fringe of wood which borders the Takutu. Sometimes the savannahs stretched to the river's edge, and formed steep banks, which now that the river appeared nearly at its lowest level, rose from 40 to 50 feet above the water. These natural sections, as a geologist would call them, show the structure of the adjacent savannah; white and ochreous clays, much mixed with rounded pebbles, formed the substratum, covered only a few inches with mould or fertile soil. Indeed I consider it hopeless to cultivate these savannahs, which may, however, prove useful as grazing grounds.\*

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\* The Macusi of Pirara have planted a piece of savannah soil, in the immediate vicinity of the village, with cotton and indigo, and when we arrived at Pirara the crop was over. During the dry season the shrubs had the appearance of dry sticks; but



I took a series of angles on one of these raised banks, which the Indians called Iperaghivi.

We started several deer which were grazing in groups of from four to ten. These regions being but seldom disturbed by the presence of man, they were more numerous than I have usually seen them. Our guns were put in request, a fine buck was soon brought down, and many others might have been obtained, if we had had means of transport.

The river as we ascend makes a considerable bend to the E., and is joined on the right bank by the small river Mauari. Above the junction the Takutu comes from the S. and W.

We reached towards 4 o'clock in the afternoon the mouth of the small river Macupara, which falls into the Takutu on the left bank. It receives its name from a tree which, I have no doubt, is Aublet's *Maconcoua* (*Ilex maconcoua*, *Pers.*); the fruit is of the size of a small apple, and has a velvety appearance, from the quantity of soft short down with which it is covered.

The boats did not reach this place, where there had been formerly an Indian settlement, till after 6 o'clock in the evening. The Indians had set the savannahs on fire on the opposite bank of the river, and the large columns of red flames, which advanced against the wind, afforded after sunset a splendid spectacle.

7th.—On starting from Macupara I preferred taking a seat in one of the corials, as it appeared to me that in this way I could trace more accurately the course of the river. We had to pass a small rapid which is doubtless imperceptible when the river is high. Whenever the river turned towards the mountains a fine prospect opened to us; the higher elevations of the Canuku chain in sight were, Iquari, Zemai, Hamikipang, with its precipitous rock; but far above all towered towards the E. the wall-like mountain Nappi (*Batata mountain*). This last-mentioned mass bore in the morning E. by S., our course being nearly south. At the end of this reach the river makes a sudden bend to the E., the savannah approaches on the left to the very verge of the river, and the western angle of the Canuku mountains becomes visible.

The river Capaya (Papaw\* River), fully as large as the Pirara, joins at the bend on the left bank; near its mouth is a peculiar formation of rock, which consists of cavernous shelves of sandstone mixed with clay, exhibiting on its horizontal planes a number of impressions that may have been left by some species of the order Isopoda. The upper structure, however, was the

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since the rain has set in, both plants have sprouted out most vigorously, and promise another crop. The indigo is used for colouring the cotton blue for hammocks.

\* *Carica papaya*.

most remarkable; it exhibited more or less clusters of cells, some square, some rounded, and from 6 to 8 inches in diameter.

About 2 miles further up the Takutu makes another bend to the E., and throughout its upper course comes more directly from the S., deviating merely a point or two to the W.

We halted in the evening near the mouth of the small river or creek Mucu-mucu, which has its source in the Guariwaka (mountain of the mist), one of the large mountains of the Canuku chain. I resolved to remain at this place for some days, as Mr. Fryer had been directed to join us here, if the state of Petry's wound permitted it.

While we were occupied erecting our tents and making the other necessary arrangements for encamping, we heard some of the Indian females cry out that a large snake was coiled up where they had intended to sling their hammocks; it proved to be a large rattle-snake, by no means a pleasant guest in the vicinity of a camp.

During my stay I took, as frequently as opportunity would permit it, astronomical observations, and ascertained, by trigonometrical measurement, the height of Hamikipang. According to a rough calculation its height is 2500 feet above the savanpahs, which is about the height of the Cradle Mountain in Brecknockshire.

Our party was successful in fishing and hunting; and as we had sent to the neighbouring settlements, we likewise procured an additional supply of Cassada-bread and ground provisions. Among the pirais which our fishermen brought in, were several of a uniform black; the iris of the eye was also black, surrounded with a golden ring. One of these fish measured 1 foot 5 inches in length and 8 inches in breadth; I considered it merely a variety of the common pirai. The Colite (*Platystoma tigrinum*),\* one of the most beautiful of its congeners, was very abundant. One weighed 16½ lbs., and was 2 feet 11 inches in length, the girth of the body amounting to 4 foot 8 inches.

I found here some of that beautiful and curious tree, which, through a misunderstanding, has been called 'Etaballia,' by Mr. Bentham.† When I first discovered this tree at the Esse-quiho, I was told by my coxswain, who was born on the river, that its name was Etaballia. But I afterwards discovered that I had been misinformed; and that the Etaballia of the Arawak Indians is the *Vochy Guianensis* of Aublet. The heart of the tree misnamed Etaballia is uncommonly hard, and would prove as ornamental as the Tiger-wood (*Machaerium Schomburgkii*; *Benth.*). It has nearly the same colour, and the intermediate woody mass is

\* Fishes of Guiana in Naturalist's Library, part i., p. 185, plate 8.

† *Vide* The Journal of Botany, by Sir W. J. Hooker. London, 1840, p. 29.

equally soft. The tree exudes, between the wood and bark, a thick red gummy substance, which, on paper, turns to a deep orange. This tree was in its full blossom, and the bright yellow of its flowers gave some variety to the banks of the river.

I consider April the commencement of the flowering season in the interior of Guiana, whether the rain has set in or not. It has been usually asserted that it requires first several days' severe rain before vegetation is awakened out of its lethargy. But although the wet month of March and part of April had elapsed without a drop of rain falling in Pirara,\* the banks of the Takutu were covered with trees and shrubs in blossom. The shrubs which, like our hawthorn, push forth, first their blossoms, and afterwards their leaves, were numerous. A splendid *Tecoma*, with its large yellow flowers, appeared sometimes as an arborescent shrub, sometimes as a tree; but although its blossoms almost covered the stems, there were only a few which had any leaves.

The splendid white flower tinged with rose of the *Gustavia*, the Cyan-blue of the *Iacaranda*, and the pure white of some *Ingas*, gave the whole scene an appearance which the tropics only can offer to the eyes of the traveller.

The palms were represented by the graceful *Cucurit* (*Maximiliania* regia), the *Ita*, and the *Sawarai*; the latter certainly not a pleasing sign to the agriculturist, who considers the soil sterile where it grows. The *Malpighia verbascofolia*, with its silvery leaves, spreads over his adjacent savannahs, and appears to exclude all other plants from the spots it occupies. Two arborescent shrubs of the same genus, one of them with yellow flowers, the other of the colour of our peach-blossom, composed the whole Flora, and did not contribute to remove the idea of the sterility of those arid plains, which have no further resemblance to the green meadows of the temperate zone, than that of being flat and covered with grass and sedges.

The mean of my observations gave for latitude  $3^{\circ} 21' 37''$  N., and the chronometers showed a difference of 20.58 miles W. of Pirara.†

\* The rainy season set in uncommonly late that year, and it was only in the first week in June that it began to rain heavily.

† MEAN OF THERMONOMETRICAL OBSERVATIONS AT OUR CAMP NEAR ISAMIKIPANG.

Period 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	6 hour.	
April 8th to 10th }	74.57	79.67	86.17	91.17	84.83	It was generally clouded and a strong breeze from the N.N.E.



11th.—I had been given to understand that the next place we would come to on our ascent was a settlement of Wapisiana Indians, near the Cursato Mountains, which we might reach by water in four days, while it took only three days' march across the savannahs; I resolved therefore to send the greater part of the canoe-men and the Indian crew by land, and to follow the course of the Takutu upwards in the corials.

We proceeded on this day without having received any information from Pirara, for although through Mr. Fryer's absence the whole direction of the expedition devolved upon me, I did not wish to defer the further ascent of the Takutu, as that river continued to fall daily. Mr. Goodall, the artist, had meanwhile been instructed how to note the time during my astronomical observations, which he undertook willingly and performed satisfactorily; and the rest of the additional business for which I had engaged Mr. Fryer's assistance was accomplished by a little exertion on my part.

Soon after our departure from the camp we passed a great many blocks of a ferruginous conglomerate, which had almost a vitrified appearance, and might have been compared to slack coming out of a furnace. Such heaped-up blocks, sometimes covering a considerable extent of ground, are very common along the rivers Rupununi, Rewa, and Guidaru. We passed the small rivers Camu and Awarimani; the former has its source on Mount Ilanikipang.

The Takutu winds considerably where it approaches the Camuku Mountains. This chain, in which we recognise the mountain Cumucunu of the map of Pontes, the Cerro del Dorado, or Cerro Ucucuamo of the journal of Santos, and the Acucuamo of Caulin,\* divides the Rupununi from the Takutu. The former river has forced its way through the chain. The Takutu, however, on arriving opposite its western angle, is turned slightly to the S.E., and then westward; and having received its tributary the Mahu, makes a sharp angle, and turns S.W. towards the Rio Branco. A single glance at the map proves that the Mahu ought to be considered the recipient of the Takutu; its continued south-western course after it issues from the Pacaraina Mountains to its junction with the Branco, and its larger mass of water, entitles it, in geographical respects, to be considered the main trunk above the junction with the Takutu. The portion between the junction and the Rio Branco ought to bear the name

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The wind blew here with great force; towards sunset it generally lulled, but began to blow hurricane-like from the northern quarter towards 8 o'clock. I observed a black cloud rise about that time in the southern hemisphere, which, when it reached the altitude of about 25 degrees, expended, and the strong breeze set in.

\* *Vide* Humboldt's Personal Narrative, vol. vi. p. 517.

of the Mahu (Ireng of the Macusi) in lieu of the Takutu; however, custom has established an opinion diametrically opposite, and it would be useless now to change a name which has existed for centuries. Nicholas Hortsman, the first European who visited these regions, named the united streams 'Mahu,' and considered the Takutu a tributary of that river.\* The Curatawuburi, a mountain of about 2000 feet in height, forms the western extremity of the Canuku chain. From this point the mountains stretch on their northern side N.E. (more accurately N. 43° E.), and on their southern side S.E. by E. towards the Rupununi; their loftiest summits, Nappi and Curassawaka, are situated on their northern side.

As it advances to the S.E., the southern range stretches from the right bank of the Rupununi eastward, in the direction of the natural pyramid of Ataripu, and the right bank of the river Guidaru, or Quitaro, a tributary of the Rewa. The greatest breadth of the range from Curatawuburi to the banks of the Guidaru, is 60 miles. The mountains which stretch southward, are irregular groups of mountains, separated from each other by savannahs, of which I shall have occasion to speak hereafter.

On approaching Curatawuburi, we found the Takutu so shallow, that we had repeatedly to unload the corials and push them by force over the sand. Large banks, consisting of heaped-up river sand, alternated with beds of rounded pebbles, as smooth and accurately rounded as if they had been wrought by instruments: they consisted chiefly of quartz pebbles, of a yellow and white colour; but amongst them I found some very fine agates, principally of that kind with interior zig-zag-parallel lines, which are known to mineralogists under the name of fortification agates, from the resemblance these lines bear to the plan of a modern fortification. Others were of a globular structure, and veined with jasper like the Egyptian pebbles. Below these beds of pebbles, and sometimes beside them, I noticed a black sand with minute quantities of gold of a light yellow; but whether the metal is present in sufficient quantities to render washing for it profitable, must be determined by closer examination than I could give it.

We were obliged to leave the corials to be lightened, and follow the bed of the river, wading through the shallows, or marching over the sand-banks. Between 2 and 3 o'clock in the afternoon the heat of the sun rose generally from 126° to 128° Fahr. This enormous heat, the glare of the white sand, which the rays of the sun heated to such a degree that it was painful to walk over it, but above all, legions of sand-flies, against the bite of

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\* *Vide Humboldt's Personal Narrative*, vol. v. p. 600.

which we could not protect ourselves, combined to render our progress fatiguing in the highest degree.

Although inured to the heat under the tropics, my face and hands were blistered, and the white sand and the dazzling mirage which hovered over the banks and the swannahs, caused inflammation of the eyes. My companions fared as ill, and we were glad when, with the setting sun, the freshness of the evening breeze cooled our burning faces, and drove the sand-flies (different species of *Simulia*) from us.

12th.—We reached the first rapids this morning: they were formed by a bar of clay slate which crossed the river in the direction of S.  $6\frac{1}{2}^{\circ}$  W.; the dip appeared N.  $60^{\circ}$  E., at an angle of about  $12^{\circ}$ . Several other rapids followed; and our progress was so much impeded, that if we had not fortunately laid in a good stock of provisions in Ilamikipang, our stores would have been exhausted ere we reached the settlement.

It became evident that it would be impossible to reach the Cursato mountains at the time we expected on leaving our camp at Ilamikipang: the river, however, was well stocked with fish, and frequented by numerous ducks and widgeons. The ducks, which we found in flocks of ten and fifteen, belonged to a species well known in our poultry yards—the musk duck, more generally known by the name of Muscovy duck, from an erroneous impression that it was introduced from Russia. This species appears to be spread over the greater part of South America, as we observe from the work of Azara, that it is also found in Paraguay. It feeds upon algae and other fresh-water productions; but I never heard of its feeding, as Azara asserts, on the root of the manioc, or cassada, which is well known to be fatal to animal life; nor do I think that it feeds upon young Indian corn or maize; but I have frequently seen it nibbling at the vegetable productions along the margins of the river. The male birds are of a glossy black, with a few white spots on the smaller wing coverts, and some white feathers near the scapulars. The warty skin commences at the base of the bill and surrounds the orbits. The musk duck makes its nest on the banks of rivers in a hollow tree, frequently in the jungle which Bambleusae and rushes form near rivers and stagnant water. I have seen young ones in May and in September, and I am inclined to think it breeds in its wild state twice a year; I have counted from eight to ten young ones. The female watches over the ducklings with great care; and at the approach of any danger, the young ones disperse, and hide themselves among the jungle and bushes which border the river: as soon as the danger is over the anxious mother collects her brood by a peculiar note. During the breeding season bloody fights occur between the male birds: where these fights have



occurred the river is covered for some distance with feathers. The musk ducks roost at night in trees, to which they likewise resort when disturbed on the water: their flight is heavy, and accompanied by a loud noise caused by the wings. The young birds, when about a year old, are delicious and highly flavoured; the meat of the old ones is apt to be tough. The name musk duck (*Anas moschata*, L.) is said to have been given to this bird on account of a musky smell which it is said to possess, but which I have never been able to perceive.

The second species, the pretty vicissi (*Dendrocygna viduata*), are generally found in large flocks. When disturbed they fly up and encircle the feeding-place; making a whistling kind of noise, not unlike the sound "vicissi," from which the name is derived. Often, though I have seen them on the rivers and ponds, chiefly in the savannahs, I have never been able to discover one of their nests. They are easily tamed, and frequently reared by the Indians, who sell them to the colonists. I never heard of their breeding in the tame state, although the musk-duck, when reclaimed, is known to do so.

There are two other species which frequently feed with the vicissi, the *Dendrocygna lugubris* (Swains.) and the *D. Autumnalis*; but if they happen to be disturbed while feeding together, they separate in their flight. The Roppong of the Macusi (*Chauliatis pallida*, Swains.) haunts the ponds, and is seldom found on rivers.

The trees of the river were frequently ornamented with numerous blue macaws (*Macrocerus araranna*), which by their cries broke the silence that otherwise prevailed around us. As they make an excellent soup, we did not spare them. They are sometimes found in couples, and at other times in flocks of from ten to twenty. When the male or female of a couple was shot, the survivor would fly round the tree, with piteous cries, and looking in vain for its mate, then fly off to the opposite shore, and again return to the spot where it last saw it alive.

According to the observations I took this night the latitude of our camp was  $3^{\circ} 12' 53''$  N.\* The mean of the two chronometers gave 26.6 miles (1m. 58.38s. in time) W. of Pirara.

13th.—We met the first blocks of granite in the Takutu this morning. I noted here a remarkable geological feature—a large block of granite-gneiss was surrounded, as it were, by contorted masses of gneiss, which rose about 2 feet 6 inches above the water. The granite-gneiss is stratified apparently at an angle of  $45^{\circ}$ , pierced by veins of quartz, and large blocks of quartz lie upon it. Above this the river takes a sudden bend, and here large masses

\* Stars observed, 1 and a. of Ursa Major; 1 and h. of Argus.

of granite, some 20 to 30 feet in height, are heaped up. Curata-wuiburi bears N. 73° E., which appears to be the direction of the strata.

We had now to pass a succession of falls and rapids; legions of sand-flies plagued us; and the thermometer showed at noon 108° Fahr.\* No breath of wind was stirring—anxiously as we wished that a strong breeze might set in, when the sand-flies vanish as if by magic. I had observed that the wind dies regularly away about nine o'clock in the morning, and only sets in again towards evening.

These cataracts are only caused by ridges or bars of rocks, which do not form real mountains, but traverse the savannahs in more or less an easterly direction. The cataract of the Rupununi (the "Corona") is formed in a similar manner in the flat savannahs; and it is worthy of remark that, where this river has forced a passage for nearly 60 miles through the Canuku mountains, it runs comparatively smooth, and only forms a cataract where it issues from the mountain pass, near the former mission Urua, or Curua.

We passed, soon after noon, the mouth of the small river Sawara-au-uru † (Sarauri, or Sarauru, in the maps hitherto published), by means of which and a portage the Rupununi is reached in 3 days. This was the portage traversed in 1739 by the surgeon Nicholas Hortsman, who left Demerara in search of gold and diamonds, which he expected to find in the interior of Guiana; and in 1793 by Francisco José Rodríguez Barata, lieutenant-colonel of the first regiment of the line at Para, who when ensign was sent twice with dispatches from the Amazon to Surinam.‡ It is still frequented by the Indians of the Takutu and the Brazilians of the Rio Branco. The river itself is about the size of the Pirara, and has its source in the Pinighette mountains.

The direction of the strata which form the numerous rapids we had to cross varied generally from S. 10° E. to S. 10° W. The rock appeared to be gneiss, sometimes encrusted with indurated clay, and with masses of decomposing quartz resting on it.

The kaiman, the crocodile of these rivers (alligator, *Sclerops*), is by no means uncommon in the Takutu. While our corials were advancing we saw a great commotion in the water about a hundred yards before us; we paddled more rapidly, and soon came up with a large kaiman, which had just secured one of its own kindred, the smaller kaikuishi. The kaiman had seized its

\* That is, not in shade, and the bulb freely exposed, but not directed towards the sun.

† Sawara is the name of the prickly palm, which I have already mentioned (*Astrocaryon laurari*): au-uru means a river in the Wapishana language.

‡ *Vide* Humboldt's *Personal Narrative*, vol. v, p. 450; vol. vi., p. 515.

prey by the middle of the body, so that the head and tail protruded on each side of its immense mouth. The *kaikutshi* still defended itself there, but without effect. On our nearer approach the *kaiman* dived; but, as it cannot devour its prey in the water, we saw it soon after climbing up the bank of the river.

14th.—The thermometer stood at 11 o'clock, freely exposed, 90° Fahr. The day was cloudy, and the wind E. by S. We passed a high bank of the river, perhaps 50 to 60 feet high, formed of a conglomerate of rounded quartz pebbles of different sizes; the cement consisting of ferruginous clay. Numerous blocks, loosened through the influence of the weather, were lying heaped up in great confusion on the side of the hilly bank. I could trace these rounded pebbles which formed the conglomerate, not agglutinated or cemented, for some distance in the savannahs, though there are no marks of the river having reached this height in our time. Our path was almost obstructed to-day by six otters (*Sutra enudris*? F. Cuv.), which appeared to contest our further progress. They raised themselves partly out of the water, and, making a peculiar snore, showed their formidable teeth. They cared so little for our presence, and came so near our canoes, that the Indians attempted to strike them with their paddles. I have little doubt but that in this instance they had their young ones in the neighbourhood; although generally far from shy, it is but seldom they show so much courage as on this occasion.\*

While the corials were passing some rapids I walked to an isolated hillock, which rose to the height of about 130 feet, at the distance of a mile from the river's right bank. The view which I enjoyed was lovely: the most prominent objects were the continuous chain of the Canuku mountains to the N.N.E.; to the E.S.E., the three-capped Saeraeri, that strange object in the landscape which forms the principal feature from whatever point it may be looked at, of a circle extending 30 to 40 miles in circumference, and a number of isolated hillocks, interrupted by savannahs, which extend from Saeraeri in a S.S.E. direction for 30 or 40 miles.

The highest summit of the Cursato mountains rose to a point to the E. of S.; and far to the S.W., the Mountain of the Moon (*Kai-irite* of the Wapisiana) bounded the horizon: a singular dome-shaped mountain towards the S.S.W., which I recognised as the Taquiana of my former expedition, but which the Wapisiana call Mariwette, appeared to be only 5 or 6 miles from my station. Four isolated hills extended from it in a south-western direction;

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\* There is some uncertainty among naturalists to which species the two kinds of otters belong, which frequent the large rivers of Guiana. The second species is much smaller than the one which attacked us in such a determined manner.



and, as the Takutu appeared to flow along these hills, promised us hard work for the following day.

We encamped on the left bank of the river, near an inlet which forms a large island when the water is high. Numerous shrubs of that species of *Eugenia* of which the Macusi Indians call the fruit "casam" bordered this inlet, the branches bending nearly to the ground under their loads of fruit. I observed several trees of *Outea acaciæfolia*;\* and a new species of *Genipa*. Some trees of the latter were so unbrageous that I erected my tent under one.

The inlet, or kirahagh, was stocked with that delicious fish the arowana,† and we saw whole shoals going in and out. This fish appears to abound in the Takutu; we frequently hemmed them in among the falls, and the Indians, armed with cutlasses and bludgeons, rushing among them, did excellent execution, to the advantage of our daily meals. Indeed, our success in fishing had been astonishing; besides the arowana, we secured numerous pirapoco, or morowai (*Xiphostoma occulatum*),‡ and patha (*Hydrocyan? Armatus*).§ The first is generally met with on sandy shallows, and in such places we had many a hunt to prevent them escaping by the single narrow channel through which water was flowing. The patha, or baiarra, frequents cataracts and rocky places, where the swiftness with which they swim, after being pierced by an arrow 5 to 6 feet long, has astonished us. Their strength is wonderful, and two of the front teeth are so long in the lower jaws as to protrude through the upper into sockets prepared for their reception.

A fish which we caught to-day among the falls proved of great interest to me: it belonged to the genus *Hypostoma*, and to that section which has the interoperculum very moveable, and furnished with tufts of rigid spines. The fins and the tail are margined with a bright orange spotted with black; the first dorsal fin is uncommonly large, and its integuments spotted with black. The strong contrast of its general colour—a dark brown, approaching to black, with the edging of bright orange—and the formidable aspect of this marked fish when it raised its dorsal fin, rendered it so interesting that I was quite delighted with my discovery; and I resolved, if it should prove new—as I have little doubt—to dedicate it to my kind friend Sir William Jardine,

\* Described since in Mr. Benham's enumerations of my Guiana plants—'Journal of Botany,' vol. ii. *et seq.*

† The Naturalist's History of the Fishes of Guiana, part i., p. 203, plate 12.

‡ Ibid., part i., p. 243, plate 23.

§ Ibid., p. 249, plate 25. This plate is not well executed: the second dorsal fin has been omitted, and the appearance of the fish has suffered in the reduction. The head is flatter than represented.

whose ichthyological researches and scientific acquirements are so well known among the friends of natural history.

Our camp was in lat.  $3^{\circ} 1' N.$ \* and 29.6 miles W. of Pirara.

15th.—Our progress was to-day interrupted by the fall Scabunk, the largest we have yet passed. It has received its name from the small river Scabunk, which joins the Takutu at the foot of the cataract from the E. This stream is called Catu-a-uru by the Wapisiana (which, as well as Scabunk-oute, signifies "sandy river"), from the heaps of sand which form its banks.

We had transported two of our corials over this obstacle, and made considerable progress with the third, so that we hoped to pass before noon, when an accident occurred which stopped our further progress for the present. The Takutu abounds in sting-rays (kaja), which partly bury themselves in the sand, and prove dangerous to those who wade through the river. Near Scabunk these fish were so numerous, that one of the Arecuna Indians was twice wounded above the instep: he appeared to suffer excruciatingly. While we were busy attempting to alleviate his pain, another Indian, a young Macusi, about thirteen years of age, was likewise wounded: not possessing so much power of enduring pain as the former, he gave way under it, threw himself upon the ground, with piercing cries, and began in his paroxysms to bite the sand, and bury his face in it. He was wounded in the sole of the foot, but he suffered the greatest pain in the groin, the region of the heart, and under the arms. In both instances I had a ligature applied above the wound, pressed it as much as possible, and had that of the younger Indian sucked. I applied poultices of cassada bread; and towards evening the pains were much alleviated.

It is but seldom that wounds by the formidable weapon nature has given to the sting-ray for its defence prove fatal. The serrated or jagged nature of this instrument causes a dangerous wound, but I doubt whether there is any injection of a deleterious liquid. It must be admitted, however, that the pains and symptoms resemble those of snake-poison; and so late as last year (1841) a valuable labourer on the plantation Zelandia, at Wakenaam, died in consequence of the wound which a sting-ray had inflicted upon him.

I observed at Scabunk, where the water had scooped out the banks, a white sandy grit, about 20 feet below the surface. The formation of the rocks is in every respect remarkable near this cataract, which, owing to the lowness of the water, was entirely exposed. The direction of the strata was  $S. 20^{\circ} E.$  They were traversed by a different kind of rock, forming dikes about 2 feet

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\* Stars observed, Argus and  $\alpha$  Ursa Majoris.

in thickness, of such a regular appearance that one might have supposed not nature but man had inlaid them. The direction of the dikes is N. 60° E. The strata are sometimes traversed by veins of quartz, which have a direction of E. 15° S.

16th.—Our patients were better. They were not able to walk, but as they could sit up in the corials, and as our stock of cassada bread was at the lowest ebb, we broke up our camp at an early hour.

We continued to toil against the rapids and cataracts. The river spread considerably, and huge blocks of granite lay about in great confusion. Some were dome-shaped, others cylindrical, but all were more or less rounded at the edges. The largest of them were from 40 to 50 feet in diameter.

We passed the fall Matzipao. While we were toiling here to get our corials across the only place where some water flowed over the rocks, we heard human voices, and soon after, to our joy, saw Sororeng and another Indian make their appearance. He had walked with the other Indians from Namikipang direct to the Cursato mountains, where they had arrived the third day after they left us. Alarmed at our non-appearance, he came to look for us. We learned from him that 3 hours' good walking over the savannahs would bring us to the Wapisiana village. Our joy at receiving this information was damped by learning that the provision-grounds of the village were so badly provided that the inhabitants satisfied themselves with eating a little Cassada-bread once a day, and lived mostly upon wild fruits and palm seeds.

I had before this time given up every idea of prosecuting our way in canoes. The fatigues we had undergone, and the little progress we had made during the last seven days, showed how impracticable it was to follow the Takutu at this advanced dry season. I therefore only wished to reach the landing-place of the village, distant from it about an hour's walk to the westward.

I noticed at the fall Dabaru an immense plateau of granite, with large flakes of quartz; veins of transparent quartz traversed it, with parallel dikes of a composition similar to that which I observed at Scabunk. We halted half a mile beyond Dabaru; and, sending Sororeng forward to the village, ordered him to bring our Indian crew, and as many of the inhabitants as he could procure next morning, in order to carry our baggage overland, it being my intention to abandon the corials.

19th.—The Indians having arrived, the corials were unloaded, and we proceeded towards an isolated hillock which the Wapisiana call Tenette. At its foot, on the south-eastern side, is the village. We had first to walk through a grove which extended partly up the hill, from which the most delicious odour was wafted towards us. I might have compared it to the fragrant smell of



hyacinths. We soon discovered the source: numerous trees of a large size, almost covered with white blossom, and dark-green leaves of a lucid appearance, scattered this delicious perfume. Its seed-vessels resembled Aublet's *Apaltoa*, and I would not hesitate to pronounce it to be *Tomhiroa aromatica* if there were not some anomalies in De Candolle's description. It may prove a new species of that interesting plant, as the inflorescence is terminal, and the leaves alternate.

We soon after entered the village, which consisted of six round houses. The captain and a great many of the inhabitants were absent. It appeared that scarcity had forced them to pay long visits to their neighbours, who were more fortunate in their provision-grounds. I found here messengers from Pirara, who had arrived this morning, and brought information that Petry, the wounded man, was by no means in such a state that Mr. Fryer could safely leave him.

A supply of rice forwarded by these messengers was a great acquisition; and, as I succeeded in purchasing three baskets of farina, I was enabled to execute my design of connecting trigonometrically the Canuku mountains with the Cursato, and the isolated groups through which we were told our path would lead us. The localities appeared to be well suited for such an operation. A short distance N.W. of the village, the hill Tenette rises 124 feet above the savannahs. It is partly clothed with wood of considerable size, but its top is almost bare, there being only a few curatella trees. Before the summit is reached, one has to cross two granitic platforms, upon which a few cacti (*Cereus* and *Melo cactus*) were growing. Near the platform among the fragments of rock are numerous myrtaceæ, and a species of *bursera* (*gummifera*?). The prospect is very lovely, and the Saeraeri mountains again form the chief object. I found here the tree in blossom which gives the wood known to the Brazilians under the name of *poa da rainka*. It is of a dark orange colour, approaching almost to red, and is used for many domestic purposes, and likewise for building small canoes. As it takes a fine polish, it would prove highly useful to the cabinet-makers. It is abundant round Pirara, but I had not before seen it in blossom. The most remarkable part is the large winged fruit-vessel, prickly near the base.\* The flower is papilionaceous, and of a pale orange colour.

Near the path which leads through the copse at the foot of Tenette is a remarkable silk-cotton tree, which astonished us by its immense size, and the extent of its ligneous buttresses or excrescences. Its height was only 102 feet, but its branches extended 129 feet; the circumference of the trunk, about one foot

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\* If I remember right, I have seen it pictured either by Jacquin or Aublet.

above the ground, was 57 feet; and the breadth of one of the tabular excrescences was 8½ feet. The Macusi call that kind of *Bombax* "copal-ye." It is the *Bombax globosa* of Aublet, of which *Bombax ellipticum* (H. B. and K.) appears to be only a marked variety.

I had selected a spot which appeared to be suited for measuring a base line, for the determination of the height of the Cursato mountains, and ascertaining the situation of the surrounding isolated groups of hills and mountains. From this point a larger base line was determined, which, resting its end on the hills Tenette and Manoa, extended in a north-western direction about 7500 yards.\*

The small mountain chain of Cursato, or, as some of the Indian tribes call it, Ursato, is of no great extent. Its whole length from N. to S. is scarcely 5 miles, and its highest summit (in 2° 47' N. lat.) does not extend 3000 feet above the river Takutu. These mountains are densely wooded, and the granite plateaux, or walls, which we observe in the Canuku chain, are almost entirely wanting. S.E. of Cursato is the mountain Durauu, and in front of it Manoa. The former is very rugged, and forms a sharp angle. Manoa has received its name from a supposed resemblance in its outlines to an ant-bear. It is necessary to be endowed with a very suggestive fancy to detect even the faintest likeness in that unshapen mass to the animal whose name it bears. A number of isolated groups, the largest of which are about 1½ to 2 miles in length, may be said to join the more extensive groups of Tuarutu and Kai-irite, either by intermediate groups or by ridges, while the latter send counter slopes towards the Pacraima chain to the N.W., and towards the mountains of the Essequibo to the S.E.

The heat was excessive during the time I carried on these trigonometrical operations; and in consequence of the great extent of the sides of angles, and having no assistant, it proved very fatiguing. I was therefore always glad to meet one of those copses of wood on the savannahs which occur more frequently on the left bank of the Takutu than on the right. They afforded shade, and at that time one tree in particular was loaded with fruit, which, in consequence of its vinous taste, proved highly refreshing. It was the *Melicocca bijuga*, a tree of considerable size, which the Macusi Indians call macu.† This tree is cultivated in

\* It must be understood that the angles were merely ascertained by the sextant; but as they were repeated on different days and at different hours, and only the mean of these observations used for the calculation, the error of an instrument so incomplete for such operations may be assumed to be neutralised.

† There are from one to two seeds in each berry: "*Bacca una sperma*," in the systematical description, must therefore be modified. I have seen as many as three seeds in one berry. The sides of the seeds, which touch each other, are flat.

the West India Islands, but is seldom met with in Demerara. Indeed I know only of one specimen in George Town. Among other fruits which were then in season was the *Duroia eripila* (*Genipa merianæ*, Rich.) and *Genipa edulis*. The first is known in the colony under the name of the marmalade box, and is delicious. The Macusi Indians call it "umpa." The fruit of the *Genipa edulis* (Rich.) resembles a mellow quince, but cannot vie with the former, although they belong to the same genus.

In our peregrinations in the savannahs we frequently met with the nests of wild bees. They belonged to a species which the Macusi Indians call Wampang; the Wapisiana *camuiba*. The hives or nests are generally fixed to branches of trees, and are from 2 to 3 feet in length. The materials with which these bees build are bits of wood mixed with glue, which they tread with their feet until it becomes of the consistence of paper, and of a firm texture. Their cells are hexagonal, and contain only what is vulgarly called worms and honey. The latter is uncommonly sweet; but it is remarkable that in none of their nests, and I have seen many opened, is any vestige of wax to be found. The bee is small, being not more than from four to five tenths of an inch in length; the body is dark brown and hairy, which gives it a velvet-like appearance; the wings of the abdomen are black, margined with a rust-coloured, almost yellowish, band; the superior wings transparent, at their outer edges brown, and marked with eight or nine cells. It stings severely; and in order to secure nests the Indians kindle fires under them, when the insects abandon their fabrics *en masse*. I have, however, seen an Indian who was the conjuror or plainman of his tribe, merely approach the nest, and knocking with his fingers against it, drive out all the bees without a single one injuring him. I noticed him drawing his fingers under the pits of his arms before he knocked against the hive.

A second species of honey-bee is destitute of a sting, and produces both honey and wax. The honey is slightly acidulous, and is deposited in hollow trees. The Macusi call this kind "mapa."

I was five days occupied from morning to night before I finished my operations in the savannahs, much to the astonishment of the Wapisiana Indians, who at the commencement could not conceive for what purpose I underwent so much fatigue. An Indian rather advanced in age, who appeared to have travelled a good deal in the neighbourhood, made me acquainted with the names of the numerous groups of mountains which I could see from my principal stations, and proved so serviceable that I gladly engaged him to accompany me to the sources of the Takutu.

The Wapisiana are taller than the Macusi Indians, and their heads are small in proportion to the body, and their necks short.



The molar or cheek bones are more prominent than with the Macusi, and their noses straighter. Their language differs materially from that of the Macusi, but it resembles that of the Pauixana, who border on their territory to the S.W. They are less industrious than the Macusi, and negligent in their houses, which are generally filthy.

These houses are built in the form of domes or cupolas, and covered with leaves of palms, chiefly with those of the *Mauritia* or *Ita*, of which there are many on the savannahs. The circular hut is about 25 to 30 feet in diameter, and is inhabited by several families. The entrance is the only aperture in this fabric, and this is shut at night by a door made of palm-leaves. There are no partitions to divide the properties of different families: a few stones, forming a hearth, are the only token of a family's right to any particular spot. Three beams, fastened to uprights by means of bushropes or lianas, traverse the hut at the height of five or six feet, and serve to sling their hammocks upon, or to deposit their bows and arrows, and that singular instrument the "blowpipe."

As every family considers it the peculiar right or duty of the other to clean their common habitation, I need not observe that none do it, and filth accumulates to a disgusting degree. The smoke from four or five fires, not being able to find an outlet but through the narrow crevices which may have been left in the thatch, circles in mazy columns through the hut, and brings tears in the eyes of those who are uninitiated to Indian life. Fowls, which are found in almost every Indian settlement, parrots innumerable, and other domestic animals, contend for the partial possession of the hut; but the large number of half-starved dogs, always ready to make acquaintance with the stranger's calves, constituted the greatest nuisance. Numbers of fleas, and that insidious insect the chigo, complete the comforts which await the stranger's arrival at such a hive. I made it therefore a rule, where no hut could be given up for our sole occupation, to prefer sleeping under the tent-cloth, or rather in the open air.

The Wapisiana wear their hair short. I have never seen a Wapisiana with his hair hanging down to his shoulders, as is often the case with the Macusi. Those who can maintain several women, practise polygamy: it is not so frequent, however, as among the Warrau and Accawai. In their domestic manners they do not differ from the Macusi, or Indians of Guiana in general.

The survey detained me till the 23rd of April at Tenette, when scarcity of provisions forced us to continue our journey. The weather had been fair, but the mornings were generally so much clouded that observations became precarious. The mean of several meridian altitudes of N. and S. stars gave me as latitude

2° 49' 40" N.;\* and the difference of longitude between Pirara amounted to 29·13 miles W. I am the more confident of the correctness of this difference of longitude, that, by measurement of the difference between Tenette and Pirara, I obtained 29·23 miles as the result. The mean would be 29·18 miles, or 1m. 56·76s. mean time.

During our stay we had an example how easily the Takutu swells merely from a thunder-storm. The rain, it is true, fell in torrents during the night from the 18th to the 19th of April, but I was nevertheless astonished to find in the morning the rocks of the neighbouring cataract Cocoya covered, and the water rushing over it with great force. Two days previously I waded to the opposite shore, the water scarcely reaching above the ankles.

I vibrated here, for the first time since we left Pirara, the magnetic needles L (a) and (b), and found that the magnetic force exhibited itself, by 100 oscillations in 2m. 51·25s., at 87° F. per needle L (a), and the same number in 3m. 56·21s. at 86° F. per needle L (b). The first result is the mean of two sets, each of 360 vibrations; the second only of one set, as a thunder-storm interrupted the experiment.†

23rd.—We were obliged to have our baggage carried upon the backs of the Indians, as we could not make any progress by water. I had therefore to increase our number considerably, in which I readily succeeded.

We left early, and reached, after an hour's walk over the savannahs, the small river Cursorari, where it enters the Takutu. We found here a canoe, by means of which we crossed to the left bank of the Takutu. Numerous trees of the *Elizabetha coccinea*,‡ with its bright scarlet flowers, skirted the river; and I found here, for the first time, ripe seeds of this interesting tree, which I hope may germinate in our green-houses in Europe. The tree bore

\* I possess 45 circum-meridian altitudes of N. and S. stars, which want of time has not yet permitted me to calculate.

† MEAN OF THERMOMETRICAL OBSERVATIONS AT TENETTE.

Period. 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	6 hour.	
April 13th } to 23rd }	75·87	79·83	87·63	90·10	81·33	These observations were made in a hut, and the thermometer guarded against any reflection of the sun's rays. It was clouded during this period.

‡ So named in honour of her Majesty the Queen of Prussia. *vide* Journal of Botany, by Sir W. Hooker, vol. ii. p. 92.

buds, flowers, and seeds. The pods, of a scarlet velvety appearance, add to the beauty of the tree.

Our course was directed towards the singular-peaked mountain Au-uru-paru. Interested by some plants, I loitered behind the marching column, when an approaching thunder-storm warned me to make haste to come up with the Indian who carried my cloak. Unfortunately I missed the way, and did not overtake my companions till I was perfectly drenched with the rain. In order to avoid some swampy ground, the guides had led across a pathless tract. It was one of those tropical torrents when the quantity of rain amounts to a couple of inches in the course of two hours; and although we had reached a copse of palms and wild plantains\* (parime of the Macusi) near the brook Totowau, it could afford us only a trifling protection. When we issued from this copse I was much pleased with the aspect of a number of hillocks, which, clothed with a vivid green, and encircled by woods, contrasted strongly with the general appearance of the savannahs. The woody tracts appeared to become more prevalent towards the W., where we traced a large fringe of thick forest, no doubt extending for a considerable distance in that direction. We soon after entered a wood, exhibiting the exuberance of tropical vegetation. Numerous palms; the broad leaf of the wild plantain, so gigantic among the Endogens that our European vegetation has nothing similar to offer; passion-flowers, with bright scarlet petals and bluish rays; psychotricaceæ with orange, and cephalideæ with rose-coloured and blue bracts, stamped the forest with a tropical aspect.

The vegetable mould upon the ochreous clay appeared to possess great fertility; I was therefore not astonished to find in the middle of the wood a spot which the Indians had cleared and planted with provisions. Sororeng pointed out to me cuttings of a plant (very probably a Euphorbiaceæ) which had been planted among the Cassada, and which he told me were used to intoxicate fish with. It may be a *Phyllanthus*, but, as only cuttings without leaves were to be seen, I cannot decide whether it was so or not.

A small hut, scarcely affording room for two or three men, rose on the side of the spot, where the circular mark of black ashes showed that there was formerly a house of some extent, according to the comparative ideas of those children of the wilderness. It was temporarily occupied by a Macusi family from the Rio Branco, among whom, to my great astonishment and joy, I recognised two Indians who accompanied me on my journey across the mountains to the Orinoco, one of whom we had been under the necessity of leaving behind in a village on the banks of the

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\* *Phenakiasperum Guianensis* (Endlicher).



Kundanama, on account of his being in too weak a state from low fever to proceed.\* On his recovery he traced his way back to his village, although it was between 400 and 500 miles, and now looked hearty and well.

After I had given my old friends and their families some presents, we continued our journey towards the naked hill Kuipaiti, having understood we should find a settlement there. It consisted of a single hut built near the foot of the hill Au-uru-paru. The inhabitants were mostly old: I observed an old woman with snow-white hair, the second whom I have seen among the Indians with that indication of great age: her skin in wrinkles, and her body attenuated almost to a skeleton, afforded an appalling picture. Curiosity induced her, in spite of her weakness, to leave her hammock to view the first Paranaghiri, as they call the light-haired Europeans, who ever visited their abode. Old age among the Indians appears in more frightful forms than with the Europeans of the temperate zone; and as if to make, in this instance, its aspect the more repulsive, she was led out of the hut by an idiot boy, who with a vacant look, his mouth open, and his tongue protruding, stared alternately at us and at her.

Idiocy is considered sacred among the Indians; they look upon those who are affected by it as marked beings, and their doings and sayings are considered oracular. In the present case the spirit did not move him, and oppressed—I will not say disgusted,—by the sight, I turned away.

A young female, indeed the only one, who by appearance and age contrasted strongly with those around her, brought me some mapa, or wild honey, which she had collected in a bottle-gourd, and which she tendered with a smile. A few strings of mock coral beads which she received in return as a present, seemed to make her happy.

Our expectation of procuring a large supply of Cassada-bread was disappointed; only a few cakes were promised us; but to make amends we were told that large numbers of deer were in the neighbourhood: I resolved therefore to halt next day, and dispatched our best huntsman in search of game. The naked hill Kuipaiti, one of the points determined from Tenette, promised to afford me an opportunity of verifying and extending the angles of my survey.

24th.—The Wapisiana Indians call all hills which consist of solid rock, and are only sparingly covered with vegetation, by the general name of Kuipaiti. The hill to which we directed our course this morning does not strictly belong to this class. The base consists of granite, or granite gneiss, forming (about 250 feet

\* *Vide Journal of the Royal Geographical Society*, vol. x.

above the savannah) an immense wall from 50 to 60 feet high, extending S.W. for several hundred yards. Near the summit the substance of the rock changes.

The seams of the stratification, where they are exposed in consequence of the rains having washed off the soil, run E.N.E., and are apparently traversed by others in a N.E. direction, which divide the rock in the form of lozenges. As the rock has a basaltic appearance, I have little doubt that it has pierced the granite. Large veins of quartz traverse this rock. At the foot of the hill lie numerous *débris*, chiefly near a ravine which, although dry at this period, may be a mountain torrent during the rainy season, when every hill sends its contribution of water to the plain below.

On our way to Kuipaiti we observed many hundreds of a beautiful white lily, which looked like stars reflected in a sea of verdure. They are generally found in moist savannahs; and their stem, upwards of 30 inches long, bears from one to three lilies (generally two), 10½ inches long, and 6 inches wide. They have a faint smell during the morning and evening. The Macusi call them *manasero*; the Wapisiana, *guatappu*. This plant is a *hippeastrum*, belonging to the order *Amaryllidaceæ*.

Our prospect from this hill was more extensive than from Tenette or Manoa; and as we were favoured with an almost clear sky, my desire to procure angles for the survey was fully gratified. I think the summit of Kuipaiti is about 500 feet; and our view extended southward to the far distant Tuarutu, and in the same direction was bounded by the mountains of the moon—the Kai-irite of the Wapisiana. Towards the north we observed the Canuku, having the appearance of a bluish line, interrupted here and there by towering clouds, which rested upon the ridge of the mountains. At our feet was the savannah, through which the Takutu meandered in numerous windings, fringed by a line of bush and high trees. Thick forests extended from Mount Mariwette, along Kuipaiti, towards the Takutu and Fort São Joaquim. The Watuwau, a tributary stream of some size, joined the Takutu towards the S.W.

I received here a proof how fallacious it is to trust implicitly to Indian information, especially when double interpretation is required to come to an understanding. When I visited the Caruma Mountains in August, 1838, an Indian, who I was told had travelled much, accompanied us to the summit, and by him I was given to understand that the Indians of the Rio Branco reached the Takutu by the route of the river Guidiwau. I further understood him, or at least so it was interpreted to me, that the Guidiwau approached the Caruma within a few miles (indeed he pointed out the water-course to me), and afterwards made a circular sweep to its junction with the Takutu, which he said was about a day's

journey from the Ursato or Cursato mountains. I mentioned this in my Report to the Royal Geographical Society, and inserted the course in my map, in dotted lines, according to his statement.\* To my great astonishment I now received undeniable proof that the Guidiwau is no tributary of the Takutu, but falls into the Rio Branco. It approaches, indeed, the small river Curati, which falls into the Takutu, a little south of Au-uruparu, so near that the two streams are connected by a much frequented portage. The name of the river Watuwau, which falls into the Takutu, and the portage between Guidiwau and the Takutu, or rather one of its tributaries, has no doubt given rise to the mistake. A traveller cannot guard himself sufficiently against false information. The wish of the Indians to be considered well acquainted with their country, or much travelled, as they express it, and occasionally misapprehension of statements made in a language which leaves much to be conjectured from the arrangement of words, or the emphasis with which they are pronounced, give rise to great mistakes in geography and natural history, especially when the traveller is under the necessity of using double interpreters.

On returning to our camp we found that our hunters had been very successful: seven fine deer had been shot in less than three hours. Being thus sure of provisions for several days, I resolved to continue our journey next morning, as we had to march 4 days before meeting another habitation.

The deer of the savannahs, the "beyu" of the colonists, is allied to (perhaps only a variety of) the *Cervus Mexicanus* of Pennant. They are found upon the savannahs in couples, and frequently in small herds of five or six. The female brings forth her young in March or April. I know not whether this species is peculiar to the savannahs of the Rupununi, or whether it is the same that grazes upon the savannahs near the coast; this, however, is certain, that it does not inhabit woods. Its wide-branching antlers disqualify it for such an abode.

25th.—We started at  $\frac{1}{2}$ -past 6; our guides led us at first over pathless savannahs, and afterwards directed their course towards Mount Wurucokua. We crossed the stream Curati, which, as I have already observed, offers a portage to the Guidiwau and Rio Branco. A tree which had been felled in such a way that its base remained on the left bank, while its branches rested on the opposite side, served as a bridge, but those who feared giddiness, and did not wish an involuntary bath, preferred wading. We next passed the low hills Wariwe, near a ruined settlement, the site of which had been judiciously chosen. They extend for about

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\* *Field Journal of the Royal Geographical Society*, vol. x.



1½ mile N.N.E. and S.S.W.; they are well wooded, and abound in rich vegetable mould for provision grounds. The eminence upon which the settlement alluded to had been erected, afforded an extensive view.

A number of detached hills, of which Wurucokua is the highest, extend in an E.S.E. direction for several miles. They are but sparingly wooded, and covered with fragments of rock: their sides, furrowed by tropical torrents, exhibit a dark red clay, quite in keeping with the yellow appearance of the few grasses and sedges which are the only representatives of vegetation on their surface. The small brook Urucokua has its source among these hills, and falls into the Watuwau. A wall, consisting of fragments of rocks, extends for nearly a mile S. 60° E. from Wurucokua, over the savannahs: it reminded me of the granitic wall of the Caquire, near Esmeralda; but where was the majestic Duida—that landmark which guides the voyager on the Orinoco for hundreds of miles—with its cloud-topped summit and colossal walls of sandstone? Wurucokua could vie with it neither in height\* nor historical interest; no Humboldt had botanised or executed geodetical measurements in its vicinity; no Spanish legend told of treasures of diamonds or emeralds buried in its bowels!

A walk of ½ an hour further brought us to a formation of indurated red clay, mixed with angular quartz pebbles, upon which blocks of decomposing granite were lying in great confusion.

The hill Piritate forms the most southern knot of the irregular groups of Wurucokua, Wayawatidu, and Wakuroite. We kept along the eastern side of these mountain groups, which stretched southwards towards Tuarutu and Ossotshuni; and south-westward towards Kai-irite. Similar groups (among which Pausette, Rhati, Duruau, Pinighette, &c., were the most considerable) stretched from N. to S. along the right side of the Takutu, a distance of from 5 to 10 miles from its banks.

About noon we entered low savannahs; small copses of shrubs, perhaps not more than 50 steps in circumference, studded them here and there. The soil was very moist, and these green spots, where everything else looked yellow from the continued drought, had an appearance peculiarly refreshing. I was not a little astonished to discover among several *Epidendrum*, the curious *Epistephium parviflorum* (Lindley), which, six years ago, I discovered upon the savannahs of the Tapacoma lake, a distance of upwards of 300 miles from its present habitat. In the vicinity of the plant I likewise saw the pretty *Bachia* (Miki, or *Cleistes rosea*, Lindley), which is found in the same situation in the

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\* The Duida rises 7147 feet above the savannahs; I estimated Wurucokua 1500 feet above the savannahs.

savannahs of the Tapacoma and Capooy. But much as I was pleased with these remembrancers of former days, and of a delightful ride in company with one of the most scientific planters of Demerara, my joy was surpassed by the discovery of a new Orchidea, among the moist places of the little copses. After exploring British Guiana from N. to S., and from E. to W., a new species added to the number of known Orchideæ would have been a source of gratification; how much more then the discovering a new genus, distinguished by habit, beauty, and fragrance!\*

We reached about noon the river Watuwau,† a foaming torrent about 150 yards wide. Although its bed was scarcely filled with water, and reached above the waist only in one or two places, we found great difficulty in fording it on account of the strength of the current and the numerous loose rocks which filled the bed of the river.

After halting for an hour, we resumed our march, and passed savannahs covered with fragments of angular quartz rocks. The highest peaks of Kai-irite bore S. 54° W. The bright rock, upon which the sun reflected its rays, shone with a dazzling whiteness; the outline of this hill resembling a crescent in the distance, the Wapisiana have compared it to the moon (Kaira in their language), and call it in consequence Kai-irite, or mountains of the moon. The rock appears to be white quartz, and like others of a similar description in the Canuku chain, the Duida, &c., being colder than the atmosphere, is constantly moist, in consequence of the condensation of vapours produced by the rank vegetation. As soon, therefore, as the sun reaches a certain height, and throws his rays under a certain angle upon the moist rock, it shines with a dazzling white, and may be seen at the distance of fifty or sixty miles. Such rocks shine periodically, according as the sun has N. or S. declination. A similar rock lies on the side of one of the mountains of Pacaraima, bearing N. 29° W. from Pirara; it shines only from May to August; earlier or later than that season the rays of the sun do not fall upon the rock at such angles as to reflect its moist surface. These rocks may be called natural helioscopes, and have served me in my geodetical operations in lieu of that instrument to determine their exact situation, and the mountains upon which they lie.

Rocks of this kind occur among the Canuku mountains at Mount Curassawaka and Guariwaka. Humboldt mentions others at the Duida, and some mountains of the Orinoco, which the

\* Drawings and dried specimens, with a more detailed description, have been sent to Dr. Lindley, to whose excellent monograph, botanists and the amateurs of this interesting family of plants, must be ever grateful; and I have no doubt that if the genus alluded to in the text is really new, a more detailed account will be published by him.

† It has received its name from the common vulture (*Cathartes aura*).

Indians have called the sun and moon. The shining rock of Kai-irite, however, is the largest of this description I have seen in my travels. At the distance of about twenty-five miles it makes an angle of  $18^{\circ}$ , from which I suppose it cannot be less than 700 feet high. The mountain chain, of which Kai-irite is the highest, is called at present by the Brazilians *Serra da Luna*. It is perhaps the *Serra Yauina* of older maps; at least it corresponds with the situation given in Arrowsmith's map to that *serra*. I have learned with surprise that, although not far distant from the Rio Branco, it is a perfect *terra incognita* both among the Brazilians and the Indians. In all my excursions I have not met with one individual who had visited it; and the Indian banishes all evil spirits to this region, while the Brazilian considers it the abode of wild Indians, who massacre any person foolhardy enough to come within their precincts.

The chain extends from N. towards S.E. It is not directly connected with the mountains of the upper Essequibo; isolated groups and savannahs, where forests alternate with grass-covered flats, interrupt the chain. However, Kai-irite has the highest pinnacles of any chain in the neighbourhood; the angle of that mountain, at the distance of 23 miles, amounts to  $1^{\circ} 16' 55''$ , and, as I was on rising ground when I took it, the height of this summit cannot be less than 3100 feet.

This measurement was made near Aruatintiku (tiger hill), a hill about eight or nine hundred feet high; it is well wooded, and has a singular peak, being no doubt a needle of granite. It gives the hill such a remarkable appearance, that it is easily recognised at a great distance, and was therefore of great service in my survey. Although named from the number of jaguars or tigers which are said to prowl about it, we selected a narrow woody valley which it formed with the next hill for our night's quarters. In the neighbourhood of Aruatintiku is a remarkable rock poised on the top of another; it resembles the celebrated rocking stone in Cornwall. Another singular rock, columnar in its shape, lies on the side of the hill next to Aruatintiku.

We found out a few small pools of bluish thick water in the vicinity of our camp, and necessity forced us to quench our thirst with it, bad as it looked. The Indians found numerous trees of the *melicocoea*, the fruit of which assisted in quenching our thirst. At night a violent wind blew from the S.W., and the trees on the hill bent under its force. It lulled about midnight, but once awoke I found it difficult to sleep again. I was amused with the regular notes of a night-hawk, which went through the scale of a musical octave, omitting only one note in the gamut.

26th.—We broke up our camp at an earlier hour than usual, anxious to fall in with flowing water. We passed the isolated



mountain groups Tabaitighu, which form almost a half circle, and appear to be connected with the western part of Aruatintiku. Mount Wayawa-tidu, which we passed yesterday, rose above them.

The little chain Muruwit rises perfectly isolated out of the savannahs; it consists of several eminences, which in the distance have the appearance of towers. The most western is a solid mass of granite, from 400 to 500 feet high; and, like all those hills of naked solid stone, is called *kuipaiti*—"the rock *par excellence*." The wish to procure some angles for my survey induced me to mount it; and there was also, I must confess, something like a foreboding that I should make a new botanical discovery, which urged me not to mind the steep and perilous ascent. I had mounted about 200 feet, when I found myself separated from the summit by a deep hollow. The place where I stood still exhibited the features of the savannah, some spots of grass, and a few stunted *Curatellas*. The almost naked mass before me was only covered here and there with a species of *Chisia*, some *Epidendrum*, and a *Monochanthus*. From the ravine or hollow rose some large trees, and by dint of climbing and descending I reached the bottom. A small rill of water meandered through it, forming a succession of cascades. It was a romantic spot; but what enhanced it was the fine odour of numerous wild pine-apples which grew in clusters along the margin of the stream. However the spiny leaves rather opposed our progress, while the delicious odour, and the citron yellow of the fruit, stimulated the organ of taste. The wild pine is small, and of a brighter yellow than the cultivated fruit. Its taste, when perfectly ripe, is highly aromatic; the only drawback is the great number of seeds which it contains, and which are so seldom met with in the cultivated pine. When we reached the granitic platform, a fine prospect opened towards Kai-irite and Tuarutu; and the bluish outlines of the Canuku indicated the direction of the path we had so far successfully accomplished. A *Eugenia*, some Cacti, and Melo-cacti, *Cyrtopodium Andersonii*, which so appropriately has been styled the sugar-cane (or *Chidea*) by the Indians, from the resemblance of its leaves and general habit to the root stocks of the sugar-cane, diversified the otherwise not multifarious Flora of *Kuipaiti*. I found on the summit a *Gesneria*, not in flower, and was already on the point of returning, having procured the desired angles, rather disappointed with my botanical discoveries, when some bright scarlet flowers attracted my attention. The side view which I had merely of the first flowers, and the yellow disk on the petals, made me almost believe I saw an *Abutilon* before me; but a nearer examination persuaded me that it was the most splendid of the family of *Helicteres*. Its large

flowers, their bright scarlet and yellow disks, as well as their peculiar form, will render it a great acquisition to our collection of hot-house plants. It is a shrub from 12 to 15 feet high; the branches straggling, of a greyish colour; the leaves are cordate and serrated; above of a dark green, but in consequence of the soft hairs, playing according as the light falls upon them, they have a velvety appearance; the lower part is downy; the calyx almost yellowish green; the petals of a bright scarlet, irregularly formed, and the upper two marked with a yellow disk. The shrub was thickly covered with flowers; it appears that they do not last long, for which, however, a succession of buds makes compensation. It is known to botanists that the fruit is spirally twisted, from which circumstance it has been compared to a screw. At the foot of the hill I observed numerous specimens of *Epidendrum pachyanthum* (Lindley) with large green flowers, which I had seen on the banks of the lower Essequibo and at Roraima. Indeed the copses of underbrush in the savannahs among which it grew, remind me much of the savannahs of that remarkable region, "the sandstone mountains of Roraima;" however, their pride, the *Sobralia Elizabetha* (Mih.) was not to be seen among the copses near Kuipaiti.

A large column of smoke pointed out the direction where the rest were halting; some had set the savannahs on fire, and, fanned by a smart easterly wind, the flame advanced with great swiftness, until it seized the fringe of wood, which bordered a small rivulet, which we afterwards crossed. The naked trees with their blackened trunks, the ground covered with whitish ashes, and a number of carrion crows and hawks, which, disturbed by the heat of the flames, flew in circles around their former roosting-places, increased the desolate appearance which a savannah offers during the height of the dry season.

The barking of several dogs told us that Indians were near. We soon after reached an eminence consisting of solid granite, and discovered an old Indian, who, with a certain nonchalance in his features, calmly waited our arrival; he was sitting on a large rock, and having thrown a glance on our number, turned his face. When re-assured by our manner, he hallooed into the wood, and soon after his daughter made her appearance with a fine boy of about 7 years of age; her husband followed in a little time; they had only arrived that afternoon from the settlement of Tuarutu, for the purpose of hunting deer, of which there are none in the mountains. It had taken them nearly three days to reach the spot where we found them.

This granitic hill was covered with numerous *Agave* (*A. vivipara*), some in blossom, surrounded by a large number of young ones, which, having fallen on the ground from the mother stem,



had taken root. The *Agava vivipara* is by no means so handsome as the common *Agava* (*Aloe Americana*): the bright orange of the latter, and its number of flowers, surpass in beauty the greenish blossom and the straggling shape of the viviparous *Agava*.

Torrents of rain, accompanied by thunder, kept us awake during the latter part of the night. Although we were partly protected by huge trees, our tent curtains were not strong enough to withstand such a severe fall of rain.

27th.—The Indians whom we had met the day previous left their sleeping-place long before daylight, in order to arrive at their settlement before us—partly, I presume, from a desire to communicate the news of the arrival of Paranaghiris, and partly to remove the fear which our appearance would otherwise have caused.

The severe rain of last night had set the savannahs under water, and we had to wade for several hours. I observed near our path an *Oncidium* with yellow flowers, which appeared new to me—at least I gathered it for the first time in Guiana. The prevalence of yellow amongst this genus is remarkable; and it will be observed that the leaves of the yellow-flowered species correspond in form, while the rose-coloured *Lanceanum*, and the spotted *O. papilio*, differ in their form of leaves from all the others. Indeed, these two species and their kindred stand singularly alone among the *Orchideæ*.

On approaching the Tuarutu mountains we entered a wood; and, passing a defile, found ourselves among hills of about 400 feet high, where savannahs appeared to struggle with forests which of the two was to prevail in the landscape. These hills were encircled by others of much greater height. Scarcely any traces of a path were visible; and I gave the necessary orders that our people from the coast should keep close together, to prevent their losing the way. We thus passed from wood to savannah, and *vice versâ*, now mounting hillocks, or winding our path among large blocks of granite. The scenery bore the stamp of great wildness. On the left we observed a remarkable rock rising solitary to a great height, much in the form of the natural pyramid of Ataraipu. Its summit was covered with vegetation, and here and there a shrub found a place in some of the clefts which the granite formed. This strange object bore N. 85° E. from our path, and was about 2½ miles distant. The Wapisiana called it Aikuwé, but I could not learn whether any traditions were connected with it.

We had again to climb a hill covered with enormous blocks of granite, between which we had to force our path. Some of these rocks were covered with *Cyrtopodium Andersonii*, Schom-



burgkia Marginata, Vanilla, Brasseeola, and a number of the beautiful *Catleya superba* (Mih.), of which I had not seen any specimens since I left the Rupununi. This force of vegetation upon a naked rock, which from its peculiar form alone would attract attention, is surprising to the stranger, accustomed to the slow progress of northern vegetation, where the blocks of granite seldom afford nutriment to flowering plants, and only some lichens spread over their surfaces.

At the verge of the wood stood a colossal fig-tree, spreading its branches to a great distance, and its horizontal branches throwing down roots into the ground, like the celebrated banyan-tree. The numerous blocks of granite which were lying below it might be compared to natural seats, while the wide-spreading branches formed an arbour that afforded most delightful shade, and invited us to rest our fatigued limbs. We had to traverse an immense solid pile of granite, perhaps a mile and a half in circumference, and 200 or 300 feet high. Numerous cavities, resembling the Kettle and Pans in Cornwall, proved the influence the weather had exercised upon this solid mass. *Cereastri*, the strange Melo-cacti, and a few specimens of the viviferous *Agava*, covered the highest summit; shrubs of *Deodanthus*, *Clusia*, and a small-leaved *Cassia*, formed the under-bush, about 50 feet below the summit. The *Cereus* is generally a token of sterility; and its upright six-sided columns, leafless as they are, do not aid in giving diversity to the surrounding scenery; nevertheless its long whitish blossom is of an elegant form. The inside, of a yellowish colour, is formed like the rays of a star. It diffuses during the night a delightful odour; and, as it is only at the midnight hour that it appears in its greatest splendour, there is a mystic interest attached to the plant, which is increased by its peculiar form. Long before the sun has reached the meridian, its flowers have faded, and hang down quite decayed. The large purple fruit succeeds, which is eaten by the Indians, and the pulp of which has a sweetish taste.

We descended, and entered another basin enclosed with mountains. Our path led now over savannahs, now through wood; and, as we had not met with any water for the last four or five hours, our thirst was considerable. We halted at noon. The greater number of our men had not yet come up, and we sent some of our guides forward to look for water. They returned without success. They brought, however, numerous fruits of the Cucurbit Palm (*Maximiliana regia*), which have a vinous taste, to which a European soon accustoms himself, although few like them at first.

After walking 3 miles through wood, we came to the river Manatiwau, glad to quench our thirst. It has dark water, and

falls into the Takutu. We halted for nearly an hour, to allow the stragglers to come up with us; but, knowing that some Wapisiana were still behind, who we believed would act as guides to those who had not come up, we at the end of that time resumed our march. We reached the Wapisiana settlement (which is named Tuarutu, after the mountain chain near which it is situated) a little after three o'clock.

The settlement consists merely of two huts, and its inhabitants were mostly old people. The young man whom we had met the day previously was a Macusi, who, having married a Wapisiana, had settled among them. They had three handsome boys—the eldest, perhaps, seven years—resembling each other so strikingly that if the difference of their age had not contradicted such an opinion, one might have thought they were born at one birth. We soon ascertained that there was not much bread to be procured at this settlement; but, as there were several others in the vicinity, where we were told they had plenty of cassada in the fields, I resolved to rest for several days, and pitched our camp in the vicinity of the settlement, near a small copse. Late in the evening we received information that all our men had come up, except the cook. A black man from the coast (Sororeng) had remained behind near the river Manatiwau, in case he should come up in the course of the evening.

28th.—We had received no tidings of the lost man, who had to ascribe his misfortune to his own imprudence, as he was warned repeatedly not to lose the Indian guide out of his sight. He had started before the hindmost party, who had rested themselves, and they had seen nothing of him since. I dispatched a strong party in search of him, and burned large fires on hills in the neighbourhood during the night.

A number of Wapisiana arrived this morning to greet the first white man who ever visited these regions. Some of them certainly presented a most grotesque appearance. One who, as we were told, was a chieftain, had a piece of calico wrapped round his loins; and his hair being turned backwards at the front of the head, that part was covered with masses of koucôn, ornamented here and there with the white downy feathers of the powis. One of his followers carried a low stool, on which he took his seat, as soon as he had made his salutation by waving his hand twice or three times across my face.

I have already observed that the Wapisiana are taller men than the Macusi. This opinion was confirmed here. They looked with great curiosity at the different objects which we had brought with us, while their chieftain remained placidly sitting at the entrance of my tent, and received the reports of what the others saw remarkable among my luggage. It appeared to be



below his dignity to go and look himself; and, as there was no doubt some difficulty in describing to him such things as they saw for the first time in their lives, a most animated conversation was carried on, which drowned every attempt to put in a word on our side. Forks are, for those children of the savannahs who see them for the first time, the most miraculous things. One passed from hand to hand; and when I showed them the use of it, they broke out into a boisterous laugh, making very likely their own comments upon the use of a utensil far inferior to the one nature has given them.

The reserve of the chieftain melted away when he left the tent, and went to the temporary hut which we had erected for our kitchen. He inspected now in his own person the numerous utensils, which his eyes likely saw here for the first time; and the wonder of the party had no end when Sororeng, our interpreter, explained to them what use we made of them.

Among the numbers who had come to visit us was a Capoucre, a cross between a negro and an Indian woman. That race is generally stronger and more muscular than the Indian, and their hair is woolly, like that of the negro. There are, however, very few in British Guiana, but great numbers are to be met with in Surinam, where it appears a great many runaway slaves have intermarried with the Caribs.

I presented to the chieftain some trifles, and he promised to bring us a supply of bread the next day.

There are several settlements in the neighbourhood, each consisting merely of one or two huts. The soil is uncommonly fertile in the copses which are scattered among the savannahs; and a wish for independence may have induced men to settle in this straggling manner. Among the presents which were brought to us were large goobies filled with dried fish. The Indian is well acquainted with the effectual method of preserving fish, by subjecting it to the smoke of a wood fire, which acts as pyroligneous acid upon the meat; and it appears he is likewise aware of the method of preserving meat by keeping the air from it.

Some other Indians arrived in the afternoon; to my astonishment I recognised in one of these a vaqueira, or herdsman, whom I had seen at Fort São-Joaquim.

29th.—The party who had been sent in search of Hamlet Clenan returned the previous evening without success. Engaging all the Indians I could procure, and not exempting an individual of our expedition, I divided our force into three parties, and having desired Mr. Goodall and Mr. Richard Schomburgk each to lead respectively one of them, I took the command of the third, and gave orders to set out in three different directions towards the mountains, with the injunction that each party was to fire every



ten minutes to attract the lost man's attention, if he was still among the living. I found great difficulty in inducing the Indians to assist me in this search. As soon as they understood from the Wapisiana, who belonged to our party, that it was a black man who was missing, they ceased to feel the slightest inclination to stir. This hatred of the red man towards the black is remarkable, and is not confined to the Indians of Guiana, but prevails equally among those of Chili and Peru. I had the satisfaction of finding Clenan at two o'clock in the afternoon. He was almost in an exhausted state, and fear and fatigue had operated so strongly upon him, that I was at first apprehensive his reason was gone. He certainly offered a most piteous appearance. His wild looks, his clothes hanging in tatters round him, and his incoherent speech, sometimes laughing, sometimes weeping, showed what impression his misfortune had made on his weak intellect. But what amused our men, when they found he was otherwise whole and sound, was the remnant of a land-tortoise hanging round his shoulders, which showed that he had made his breakfast upon it, wisely preserving the remainder for his dinner. He had always shown the greatest abhorrence for this animal, and considered us very likely as bad as cannibals, when he was obliged to prepare it for our meals; and his repeated observation had been, that he would rather die than eat of it. How faithfully he had kept his vow when in necessity, was evinced by the small remnant of the land tortoise. I had provided myself with the necessary remedies for restoration, in case we should find him exhausted, which were used with full success. As he was too weak to follow us at that time to the village, I ordered the coxswain and one of the canoe-men to remain with him, and bring him next day to our camp. We arrived there at dusk; the others had reached before us, of course without success; and all were glad that in this instance also no loss of life of any individual was to be connected with our expedition. Petry's accident was still too fresh in their remembrance to allow them to have forgotten the dark forebodings of the superstitious.

We were now comparatively among the mountains. To the N. the Tuarutu raised its summit to about 1800 feet; the next highest hill to it being about 1150 feet above the Takutu. The Tuarutu chain is about ten English miles in its greatest length, and forms an irregular mass, enclosing savannahs and monticules of solid granite. Huge blocks of the same rock lie about in great confusion, and bear witness to some convulsion. A bare rock, resembling Ataraipu, which the Indians call Aikuwé, is the most remarkable feature of this knot of mountains.

A plain, where savannahs are interspersed with woods of no great extent, and here and there covered with hills which rise

from 150 to 200 feet above the Takutu, connects the Tuarutu with the Ossotshuni. That small mountain chain extends 11 miles in a N.E. and S.W. direction. Nowhere have I seen so many granitic and amphibolitic rocks as in the Ossotshuni mountains. Uruwai, Wapung or Wahunna, Curushiwini, are masses of granite which rise to a height of 1500 and 1800 feet, and white spots of quartz contrast in a most striking manner with the dark mass which otherwise presents such a gloomy appearance. The Wapisiana of these regions relate that the tobano grows wild on Uruwai. To the S. of Ossotshuni commence thick forests, and the blue outlines of the Essequibo mountains break the horizon to the S.S.E.

*May 2nd.*—With a supply of provisions, and the promise of our Indian friends to provide more on our return, we started this morning after nine o'clock, and crossed an hour afterwards the rivulet Turerucatakurin. Its long name did not correspond with its importance as a flowing water. It flows into the Ossotshuni, which has its source in the mountain chain of the same name. Our way led along that chain, which we kept a mile or two on our right, and an isolated hillock of a pyramidal form was our guide. We reached about noon the small river Taramibawau, certainly the most considerable we had passed. The waters were flowing over large shelves of granite; those parts which were not under water were covered with orchidæ nearly to the verge of the stream.

We passed the isolated hillock on our left, and directed our course towards some eminences, called Wawacunaba, from the height of which we enjoyed a most beautiful prospect over the savannahs. The mountain Vinudaua (Vindiau in my last map) was the most striking object. At this place the Takutu receives its first tributary of any consequence. It bore S.S.E. Behind Vinudaua we discerned the bluish outlines of a large and high mountain chain, in which I greeted old acquaintances. They were the Wanquwai and Anneu mountains, near the confluence of the Yuawauri, or Cassikityn, with the Upper Essequibo. Further eastward I noted a chain of mountains equal in height to the Wanquwai, which the Indians named Uassari, and I gladly recognised in this name a mountain chain which Humboldt mentions in the sixth volume of his "Personal Narrative," p. 523, but the latitude which he states is at least 40 miles too far north.\* They appeared to be high, surpassing the Tuarutu or Ossotshuni, but the distance did not permit me to judge whether they were wooded, or consisted, like the Ossotshuni, of bare granite. The rocks, which were scattered in fragments on the summit of Mount Wawa-

\* Their latitude is about  $1^{\circ}40'$  N., according to some angles I took at the Tuarutu.



cunaba, were highly crystalline. We entered shortly after a wood, consisting of numerous palms of the genera *Astrocaryon*, *Bactris*, *Euterpa*, and *Maximiliana*; the wild plantain (*Phenakasperum Guianensis*) grew most luxuriantly, and often attained a height of 50 feet. The soil was a rich loam mixed with white sand. A small rivulet, the opposite side of which was grown over with *nastus*, or wild bamboo, afforded water, and our tents were soon pitched in its neighbourhood, shaded by the princely *Carolinea*. Some of its fruit burst during the night with a loud crack, scattering the seeds which they contained all around, many of which fell on the tent, making a noise like hailstones.

3rd.—Mount Vinudava bore in the morning S. 26° E. We continued our course along the Ossotshuni mountains, and reached after two hours' march a deserted settlement on an eminence. On entering a wood I observed with pleasure the graceful *Mauritia aculeata*, the first I had seen since I left the Rio Negro.\* As on the banks of that river, so here it grew in clusters. The Wapisiana Indians call it urukush. We walked afterwards through a forest of *bactris*, among which the majestic turn-palm raised its head to a considerable height, and large clusters of its purple fruit contrasted strongly with the dark leaves of the *bactris*.

We met in the forest such a numerous body of Cushi ants (*Atra cephalotes*), that their number would be disbelieved if I were even to estimate it far under the truth. They were marching in an uninterrupted column about a foot wide, and three to four hundred yards in extent, towards their hill or nest, carrying bits of leaves which they brought from a tree 80 to 90 feet high. Some were occupied in bringing the leaves from the tree to its foot, where they were deposited, while others took them up and carried them to their nests. And although the ground was covered with their numbers, passing and repassing, and carrying loads perhaps five times their own size, no disorder was observable in their columns. They seize the leaf with their mandibles at one of the ends, and carrying it upright it appears like an umbrella kept over the body to shade the ant against the sun and weather. Some of the colonists call them, therefore, the umbrella ants. They are mistaken, however, as to the aim which the insect has in carrying the leaf in that manner; it finds it an easier way to carry such a burden, and takes up less room while marching towards the common nest. Here they amass masses of leaves which would astonish any one unacquainted with their habits.

These ants are great enemies to the agriculturists; and if their nests are in the vicinity of provision-grounds all cultivation ceases. Many a village, many a provision-ground, has been abandoned

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\* Journal of the Royal Geographical Society, vol. x.



on their account, as it proved impossible to raise a vegetable near them; cassada, yams, batatas, are alike subjected to their destructive propensities. Their hills are frequently several hundred feet in circumference, and from ten to twelve feet high, and so undermined that it is dangerous to walk over them.

Among the palm-trees grew a large number of juvia-trees (*Bertholletia excelsa*), the fruit of which is well known under the name of Brazil nuts. They had done bearing, but we found a few of the large ligneous fruit on the ground, which we gladly opened to procure the tasteful nut, more delicate in its fresh state than when shipped across the Atlantic.

We now ascended hills of 150 to 250 feet in height; their summits were dome-shaped, and covered with numerous fragments of angular quartz. I observed a large fig-tree, perhaps 120 feet in height, with large tabular excrescences like the mora-tree (*Mora excelsa*, Beth.), and leaves similar in appearance to those of the *Caladium arborescens*, or *Muc-muca* of the colonists. On the summit of one of these hills large plates of mica protruded among fragments of quartz, which our Indians collected eagerly as curiosities. We next descended a hill several hundred feet, and, coming out of a copse, saw two huts before us, which were inhabited by Macusi Indians. The chieftain of the place, whose name we understood was Tuma-tuma, awaited our arrival, with great indifference, in his hammock. He was one of the stoutest Indians I had seen.\* While our guides made him acquainted with the

\* He allowed me, in his good nature, to measure him, after we got better acquainted, and I add here a comparative measurement of him and another Macusi Indian, by the name of Mingai, of nearly the same height.

	Chieftain Tuma-tuma, of Maraka.	Mingai.
	Feet. in. 3 4	Feet. in. 5 5
Common height . . . . .		
Long diameter of the head from the superior angle of the occiput to the chin . . . . .	0 10	0 11
Circumference of the head round the forehead above the ears . . . . .	1 10	1 10·2
Upper extremity, from the head of the humerus to the end of the middle finger . . . . .	2 5	2 4
Lower extremity, from the head of the femur to the heel . . . . .	3 0	3 0·3
Circumference of the upper part of the arm . . . . .	1 0·3	0 10·8
Ditto of the lower, below the elbow . . . . .	0 11·2	0 9·7
Circumference of the upper part of the thigh . . . . .	1 9·5	1 7·9
Ditto of the calf . . . . .	1 2·3	1 1·4
Breadth of the chest between the shoulders . . . . .	1 9·3	1 5
Circumference of the chest . . . . .	3 3·7	2 11
Ditto of the abdomen . . . . .	3 4·6	3 0
Length of the right-foot . . . . .	0 10	0 10
Ditto of the right-hand . . . . .	0 7	0 6·7

object of our journey, he only gave his abem! without betraying the slightest interest in us or those who were with us. The females, however, did not constrain their curiosity in such a determined manner as Tuma-tuma. By that sort of freemasonry which prevails among the fairer sex of God's creation, they soon became acquainted with the Indian women in our train, and, inviting them into their huts, no doubt received as much information as they desired.

Our tents were erected near the banks of the Watiwau, which we had crossed a few days previously as a mountain torrent: here it had dwindled to a small brook, only a few yards wide, and at present forming merely pools. It has its source 5 or 6 miles further to the southward.

The inhabitants of the settlement Maripa consisted, at the time of our visit, of only 20 individuals. A sickly-looking person, who had dressed himself, according to the civilised fashion, in shirt and trowsers, and covered his head with a red woollen cap, made his appearance and greeted us. He was some relation of the chieftain, and appeared to pride himself not a little upon being dressed like ourselves. Whence he had got his suit of clothes at this distant spot was for some time a riddle to us; but, as we afterwards learnt that he was a great trainer of dogs, of which the number was at least equal to that of the human inhabitants of the village, we conjectured, perhaps rightly, that he might have received it in exchange for one of his canine pupils.

There were several other settlements in the immediate vicinity; and, as our expected arrival had been announced the previous day by some Wapisiana from Tuarutu, who, anxious to carry the news of our visit, had not minded the journey of two days, we saw soon after our arrival a party coming to greet us, with their chieftain at their head. These two important men, the chieftains of Maripa and of the neighbouring settlement, were a true exemplification of Pharaoh's dream of the fat and lean kine. The new comer was a tall lean man, with a ghastly expression, which was much increased by having lost one of his eyes. He told me, through our interpreter, that he would order some bread to be made for us, and would show us, if we wished, the way to the sources of the Takutu, where he had been very recently.

I had understood, from some of the Indians at Tuarutu, the sources of the Takutu were at Mount Vinudaua: however, we learned here that this river only received its first tributary from Vinudaua, and has its source further to the S.E.

The coxswain had sprained his ankle, and, expecting that he should be able to walk if a day's rest was afforded him, we delayed our departure. The reserved manner of Tuma-tuma gave way before four-and-twenty hours had elapsed. I rather think

he at first mistrusted us. He came to my tent and inspected what appeared remarkable to him. In spite of his size he walks briskly; and before he became so stout he must have been a handsome Indian. His eyes were rather oblique, and there was a peculiarity in the orbital process, the horizontal diameter of which is generally with the Macusi Indians from 2.3 to 2.8 inches, while in his it measured only 1.5 inches. His wife was much younger than himself; she had two children, the youngest about five or six months of age, and was again far advanced in pregnancy.

I bought here a young tiger-cat, it had been caught only a few days previously, and possessed all the wildness of its race. It was too young to judge with certainty, but I think it was either a specimen of the *Felix pardalis*, or the *Felix macroura* of Prince Maximilian of Neuwied. The number of tiger-cats, or jaguars (*Felix onca*), must be enormous in this neighbourhood; the women and children wear tigers' teeth round their necks, to which they ascribe talismanic power. I possess two canine teeth of a jaguar, which had been killed, only a few days previous to our arrival, near the village, which measure  $3\frac{1}{2}$  inches in length and 3 inches in circumference round the thickest part of the root. As there are no cattle within 80 or 100 miles of this spot, they must necessarily live entirely upon aguris, peccaries, and deer. The Macusi pretend that they attack man, and told us many wonderful stories of hairbreadth escapes.

We saw several baskets of Brazil nuts in their huts, and were told that they were very numerous about Vinudana. It appears that the tree prefers stony soil, and a moderate height above the sea. I have never seen the *Bertholletia* at a greater height than 1500 feet above the sea, and scarcely lower than 400 feet (on the banks of the Guidaru). The distribution of this useful tree is however extensive. It is found on the banks of the Amazon, the Orinoco, the tributaries of the Essequibo, and as far E. as Berbice. Its geographical range is, very likely, between the meridians of  $57^{\circ}$  and  $68^{\circ}$  W. of Greenwich, and the parallels of  $6^{\circ}$  S. and  $4^{\circ}$  N.; the most northern parallel where I have met it was the third.\*

*May 5th.*—Our number having been increased by the lean captain, who was to form our guide, and four of his attendants, we started this morning at 8 o'clock.

We had to pass the settlement of our lean friend, and had occasion to admire the neatness of his hut. In lieu of walls, it was closed in with the bark of a tree; and the interior was cleaner

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\* Near Pukassanti, a Carib settlement on the banks of the Guidaru, in  $3^{\circ} 4' N.$  latitude.



than the generality of Indian huts. The utensils of the chase, bows and arrows, and the blowpipe, were properly arranged: and we found the women had been working on some large earthen pots, which, when we consider they were made without the potter's wheel, merely with their hands, deserved every praise.

After it had been settled, by means of the cudgel and the shrill voice of the squaws, which dogs were to accompany their master, and which to remain at home, we continued our march, and soon after entered a thick forest, which we did not again exchange for savannahs until our return. Our course was mostly in a S.E. direction, through a forest, very likely not trodden before by European feet. As it was merely a hunting-path, the tracks were soon lost, and we had to trust to our guide's Indian sagacity to wind his path through the wood, which surpassed even tropical exuberance. I observed several trees in our path which I had not noticed before; amongst others a gigantic tree with excrescences like the remarkable Yaruri, or Massara,\* the trunk of which, from 5 to 6 feet in diameter, and to the first branches perhaps 50 feet high, has the appearance of being fluted, or as if it consisted of numerous slender trees. The present species differed only in its trunk being not so much fluted, and the tabular projections of the lower part being much larger than those of the true Yaruri. The Macusi called it "itsha:" and, if the seeds which I collected at its foot belonged really to it, as I was told by the Indians—who, by-the-bye, eat them, after being boiled—this tree belongs to a different genus and a different order than the Yaruri which Martin ranges under Apocynaceæ.

We followed the dry bed of a stream. Among some leaves which the wind had thrown down from the neighbouring trees, and which were being heaped up at a bend of the river's bed, I observed a yeast-like matter; curious to see what was under it, I pushed my stick into it, when a hollow grunting noise issued from it. To my astonishment I was told that it came from a frog. How the animal makes this whitish foam, which would have filled half a bucket, and for what purpose, remains a riddle. There was no spawn visible; and the yeast-like matter or foam might have been compared to anything else but to the whites or mucus in which their eggs swim after the spawn is emitted. I was really sorry that I did not succeed in procuring the frog, or at least seeing it, as all our search among the dry leaves proved useless. The Wapisiana called it *pari*, and the Macusi *truwé*.

We passed several wild-bees' nests, constructed in hollow trees. These insects have no sting, and their honey, or *mapa*, as I observed previously, has an acidulous taste. If some unlucky

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\* The Yaruri is a new species of *Aspidosperma* (Martin).

passer-by knocked against the tree or their entrance, which is frequently funnel-shaped, and constructed with a sort of mortar made of earth, they appear in legions and settle upon him; and although they do not sting they prove very troublesome, especially if they get into the hair, which they seldom fail to do. What a scampering over bush and stick, when by accident or in frolic the winged colony had been disturbed! The Indian runs generally on such occasions with his head bent downwards, and tries to get out of their reach in the speediest manner possible. We attempted to follow his example, but generally knocked our heads against the branches, which he knows carefully how to avoid.

We had been marching four hours without finding any water; the discovery of a hog plum-tree (*Spondias lutea*), with a quantity of ripe fruit, was therefore highly welcome. It appeared a flock of peccaries had been regaling themselves when our arrival must have driven them to flight. Some of the huntsmen followed, but returned unsuccessful. The hog plum-tree is by no means scarce in Guiana; it forms a high wide branching tree, the wood of which would prove useful.

We stopped at four o'clock, near the banks of a dry river, much fatigued, and thirsty in the extreme. We had not found any water in the course of our whole day's march; and, although the Indians kept digging holes in the ground, it was without success.

The followers of our guide allowed themselves scarcely any rest before they were assiduously occupied in erecting for their chief-tain a hut of palm-leaves. One acted as cook, and grilled upon a stick part of a *powis*, which had been shot that morning. A plate of delf, in the possession of which our guide no doubt prided himself not a little, was then carefully taken out of the basket, or rather, and put before him. He dined in solitary state; after he had finished, and the plate had been carefully put away, his attendants ate the remainder.

6th.—Fortunately a short hour's walk brought us this morning to the Takutu; and although the water appeared stagnant, and was covered with a greenish film, our thirst was too great for us to refrain from drinking of it.

The bed of the Takutu was only 10 or 12 feet in width, and its waters were merely collected in pools, without flowing in an uninterrupted stream. The colour of the water is almost black, from which circumstance the Wapisiana call the Takutu Butivan-uru, or black river. It would certainly be a misnomer at its lower part, where the water, before it is joined by the Mahu, has almost a bluish colour. Its course through the ochreous and clayey savannahs changes its colour to a muddy white, and during the dry season to a bluish colour. I have not been able to

ascertain the origin of the name Takutu; perhaps it is synonymous with black river.

We followed the bed of the river for several miles upwards. An Indian, who mounted a high tree, saw some small hills in the direction of N. 80° E., distant a few miles, but no mountains were visible. A small stream, now perfectly dry, joined the Takutu on the right bank; and shortly after another on the left, likewise dry. Above the junction of the latter the Takutu dwindles to a rill, bordered by high trees and thickets of wild bamboo (Kappu in Macusi). The vault of heaven was scarcely visible through the arches which the bamboo, and numerous branches of trees, form along its banks, and consequently any astronomical observation was rendered next to an impossibility. I recollected, however, a fine rocky platform, which we had passed, and when the river was wider than it generally is, being extended by the passage of the rocks. We returned to it, as the most eligible place for my observations. This spot is in 1° 5' N. latitude,\* and 19 miles W. of Pirara.

The Takutu flows from hence N.E., and receives from Mount Vinudana approximately in 1° 55' N. lat., a tributary of nearly its own size; it then takes a north-western course through savannahs interspersed with wood, and having passed the Tuarutu mountains to the E. of that chain, it receives the waters of the Watiwan, a river nearly of its own size. Its course is now a point or two to the E. of N., through bare savannahs and its tributaries, merely savannah rivulets, until it is joined by the Mahu in 3° 35' N. lat., and 24 miles W. of Pirara. After the conjunction of the two rivers the stream follows a south-western course, and receives the river Zuruma or Cotinga on its right bank: it ultimately falls into the Rio Branco, a few hundred yards above the site of Fort São Joaquim in 3° 1' 46" N. lat.

I calculated the whole course of the Takutu, from its source to the junction with the Rio Branco, at 200 miles. The last 50 miles it makes a retrograde course (namely S.W., its course having been previously N.) towards the Rio Branco.

7th.—Starting at an early hour, the return path was accomplished in a much shorter time than our outward journey; and I found an opportunity to determine on my arrival at Maripa the difference of longitude between our camp, at the sources of the Takutu, and that village, by horary angles of the sun; only twenty-four hours having elapsed since I had taken similar angles at the Takutu, the difference of longitude (21s. 58 in time) can be the more depended upon.

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\* This is the mean of the meridian passages of several N. and S. stars, but not the mean of the circum-meridian altitudes which have not been calculated as yet.



The intensity of the magnetic action manifested itself at Maripa by 100 oscillations in 2m. 51s. 27 at 88° Fahr. by needle L (a); and in 3m. 56s. 89 at 85° 8 Fahr. by needle L (b).

The thermometer under our tent kept generally in the morning at 6 o'clock at 70° Fahr., and rose, between 2 and 3 o'clock, to 98° Fahr.; it then began to sink gradually to 84° at 6 o'clock in the afternoon, and stood from 72° to 74° at 9 o'clock in the evening.

The latitude of Maripa (mean of meridian altitudes) was 1° 54' 37" N., its difference of longitude 24 miles W. of Pirara.

*8th.*—I found myself under the disagreeable necessity of leaving the coxswain at Maripa until he considered his foot so far restored that he could follow us. Being amongst friendly Indians, and amidst plenty of provisions, I considered it a much more prudent plan that he should await the cure of his sprained ankle, than venture upon the tedious and fatiguing march we had before us.

Our guide to the sources of the Takutu, the one-eyed captain, promised to accompany us, with several of his followers, as far as Tenette, which we gladly accepted, as it was requisite to take from this place, and from Tuarutu, the provisions for the whole of our return journey to Pirara. We knew from experience that we could not procure any provisions from Tenette.

Our party amounted to nearly fifty individuals, including women and children, besides a number of dogs, which would have out-numbered the packs of many a fox-hunting squire. There were twenty-five of the canine race, and when they began their barking noise in chorus, there was enough to make one momentarily deaf. The finest among their number was, however, a dog from the Taruma nation, with which I was so much pleased that I induced the owner to part with it for a gun. Its name was Tewanaud. The Woyawai and Taruma are considered the best trainers of dogs; and these animals constitute a kind of merchandise, or article of barter, between them and their neighbours. This dog was of an uncommonly large size, and as it appears a well-marked variety, I have added below a more detailed description. I have only to regret that it was emasculated, a custom which the Taruma follow under the supposition that they grow fat under it.\*

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\* The Taruma dog:—Well formed, something between a greyhound and pointer; head broad, muzzle long, moderately pointed, ears erect, neck long; tail long, carried erect, slightly arched, the hair on it short; the chest rather narrow; the belly drawn up; eyes brown, pupil black; prevailing colour white, with large black patches; head and ears black, round the eyes, towards the angle of the mouth; point of muzzle white; root of tail black, otherwise white to the point; hair short. Its length from the tip of the nose to the point of the tail 4 feet 3 inches, of which the tail was 1 foot; height 1 foot 11 inches; girth of the body 2 feet; girth near the hind feet 1 foot 6 inches; muzzle, from the superior angle of the head to the tip of the nose, 9·3 inches; length of ears, 3 inches; space between ear and ear 4·7 inches; circumference of the muzzle

We reached our old quarters at the Tuarutu mountains at 11 o'clock on the morning of the 9th of May; and as I considered it necessary to ascertain here the position of some of the neighbouring mountain groups by trigonometrical operations, and to procure a larger stock of provisions, our departure was delayed until noon of the 11th.

11th.—I resolved to cross from the Takutu to the Rupununi, while Mr. Richard Schomburgk, who was then suffering under a tertian ague, returned with his party direct to the Cursato mountains. We had marched about 4 miles over savannahs, interspersed with copses, among which I saw numerous specimens of the beautiful white orchidea, which I found first near the Watiwau, when we crossed, after 1 o'clock, the river Warimi-wau, just a little below the junction of the Paipaitshi-wau. I discovered here a tree with large purple fruit, which resembled in taste our common cherry, with a slight acidulated flavour. The Indians call it Turuaku; and I would have considered it a *Eugenia*, or a genus allied to it, if the presence of stipule did not argue differently; its leaves are opposite, and there are small stipule at the base of the leaf. The farther we advanced to the E. (our course having been mostly N.E.) the scarcer became those copses which had hitherto almost prevailed over the savannahs; and about 3 o'clock we again entered the open savannah, with only here and there a curatella tree, or some Malpighine, and numerous *Mauritia* palms. The highest summit of Tuarutu bore then N. 43° W.; and a small mountain chain called Tshuna, along the western foot of which we understood the Takutu was flowing, bore E. by N.

It was nearly 6 o'clock before we reached the Takutu, here about 80 feet wide, and flowing over numerous blocks of granite. We found it not difficult to step across without wetting our feet, so numerous and large were the rocks which impeded its course.

12th.—After I had taken a set of horary angles of the sun, for the determination of the difference of longitude, we continued our march. Our huntsmen had brought in this morning a couple of deer, the first which they had procured since we left Au-uru-paru. It is remarkable that at the Tuarutu and Ossotshuni mountains, the deer of the savannah is not to be found, although there is savannah ground between them.

The savannahs consisted now of undulating ground, the height of the summits being from 40 to 50 feet. They are covered with fragments of angular quartz rocks, which rendered our path very fatiguing. The Macusi Indians call these rocks "wata-yeku,"

just below the eyes, 8·7 inches; fore foot, from head of shoulder, 1 foot 10 inches; hind foot, 2 feet. The dog from which the measurement was taken might have been two years of age.

and the small nodules of clay ironstone which sometimes replaced the other, "mari-yeku." These nodules are sometimes pisiform, and have a black shining surface. A species of grass, which is very common in the savannahs, is called "vannah" in Macusi, and the spots which are covered with it "vandai." Whether this is the origin of our adopted word "savannah" I will leave the etymologists to decide. However, since we know it to be of American extraction, the coincidence is striking. The word "ite" expresses, however, savannah of any description.

We experienced at noon one of the strongest whirlwinds I had witnessed upon savannahs. It whirled leaves, sticks, and whatever it could seize, several feet into the air, and raised a column of dust of 200 or 300 feet in height. The Macusi called it "uranan;" and I understood such phenomena are very frequent here. The peculiar position of the mountains may give rise to them. The column of dust took a S.S.E. direction. The way in which the Macusi pronounce the word "uranan" reminds me of "hurican," likewise an adopted word of our European languages.

A poor goat-sucker attempted to escape its influence, but being seized was whirled for a considerable distance into the air. I had been frequently amused, during our monotonous walk over the savannahs, with the strange manners of the Caprimulgi, or goat-suckers, when they saw our large column approaching their resting-places. They generally cowered down, and ducked their heads to pass unnoticed. On approaching them nearer they watched every step; and if we stepped on one side, under the impression that the bird in its stooping position cannot look around, it turned so swiftly that the Indians said it had a pair of eyes at the back of its head. Only when approached within a few feet it takes to the wing. The Indians have the greatest superstition with regard to this bird, and would not kill it for any price. They say it keeps communication with the dead, and brings messages to their conjurers. Even the common people on the coast retain in a great measure this superstition, and hold the bird in great awe. Its nocturnal habits, the swiftness and peculiarity of its flight, and its note, which breaks the silence of the night, have no doubt contributed to the fear which Indians and Creoles entertain for the Wacarai or Sumpy bird.

The small chain, Tshuin, consisting of hills from 400 to 450 feet high, bore this evening, from our camp, S., distance about 6 miles.

We had stopped at rather an early hour, as our guides told us we should find no water before darkness came on, if we marched farther. It is advisable at all times to pay attention to what the guides observe with regard to water, as I know from experience,



that, anxious to continue the march, I once or twice did not mind their advice, and had to pay for my imprudence by suffering the tortures of thirst.

Our tent was erected near a small river, and in the vicinity of some large pools of water, cold, and nice of taste. These natural reservoirs are a great blessing for those who have to traverse the arid savannah, where the traveller is exposed to the direct rays of the sun, and suffers the more from thirst. Numerous temporary huts are therefore generally in the vicinity, which are from time to time repaired or renewed, as the circumstance may require, by those who pass the road, and use them as night quarters. Our camp was this night in  $2^{\circ} 19' N.$  lat., and about 5 miles W. of Pirara.

The thermometer stood, at 2 o'clock in the afternoon, in the shade of the tent, and surrounded by trees, at  $96^{\circ}$  Fahr.; at 3 o'clock at  $89^{\circ}$  Fahr. The stars were clouded and undefined.

13th.—We broke up our camp, and started at 6 o'clock. The morning was clouded, and a strong breeze (from 5 to 6) blew from the N.E.; the thermometer  $71^{\circ} 5'$ . The hills continued to alternate with low grounds, and rendered our march very monotonous. These savannahs present many inequalities. They consist of ranges of hills, having more or less a N. and S. direction; and the aspect of numerous *Mauritia* palms convey the hope to the weary traveller, when seeing them in the distance, of enjoying at their foot a refreshing drink of water; or he fancies he sees it flowing in the gullies on the sides of the low hills, which he observes to have been torn by torrents of water. In lieu of this, however, the ground under the *Mauritia* is as dry as the surrounding savannah; and the gullies present only red ochreous clay, denuded of grass, and covered with the debris of quartz rocks.

Our monotonous march was interrupted by a fox-hunt. The dogs started a savannah fox (*Wæ-ré*, in Macusi), which led them a famous chase. They followed Reynard in full cry—the Indians shouting, and encouraging their dogs. When overtaken, he defended himself with great obstinacy. The fine large dog "Tewanand" seized him by the neck and worried him; and he was lying apparently lifeless on the ground, when unexpectedly he jumped up, seized the nearest dog by the nose, which, with most piteous howling, tried to disengage himself from such an attack, but in vain, until its master killed the *Wæ-ré* with a stick. The fox of the savannahs is somewhat smaller than the European fox. It is of the colour of our hare; whitish under the throat; and along the back to the tip of the tail, which is pointed black, runs a black line. The feet are darker below the knee-joint; the neck below the ears is of a reddish brown; the head, from ear to ear, lighter; along the snout a little darker; the eyes are brown,

with a dark blue pupil. I have given here the description, as the Waé-ré appears to be the same species as Azara's Agouara guazon, the *Canis jubatus* of Desmarest.

We had reached the highest ground between the two rivers (the Takutu and Rupununi) at half-past 8 in the morning. I considered it 150 feet above their level; and as the distance of the Takutu is 12 miles from hence, and of the Rupununi merely 6 miles, it will be observed that the rising of the ground is more gradual from the Takutu than from the Rupununi.\*

Our course was N. 56° E. At the horizon, in the E.N.E., I observed the granitic hills Tambaro, on the summit of which I was in March, 1838, and thus found an opportunity to connect the present survey with the former. Further eastward we saw the Pararaima mountains, their western declivities inhabited by Atorai, the eastern by Taruma. We entered at noon the Wapisiana settlement, Cau-urua, consisting of five huts. The inhabitants were not numerous, scarcity likewise prevailing at their settlement; and the greater number had gone visiting those of their friends who were more plentifully provided with the staff of life. A dwarfish old man, the smallest Indian I have seen, made us a long speech, which Sororeng interpreted as conveying to us his regret that they could not give us a supply of provisions; but as we had enough, and did not intend to stay longer than the next morning, I told him to console himself on that head. Towards evening several of the other inhabitants came in, who had been fishing, but, as it appeared, with little success. Their whole body was painted black: some of the figures exhibited labyrinths, others grecques.† Among the females was one who distinguished herself by her fine figure and handsome features.

We had erected our tents among a number of Parica trees (*Mimosa acacioides*, Benth.), the seeds of which are used by several tribes of Indians along the Amazon and Rio Negro—namely, the Uaupes, Puros, &c.—in the same way as the Otomacs and Guajibos at the Orinoco use the bean of the *Acacia niopo*. They are pounded to powder, burnt, and the smoke inhaled; or the powder is put into the eyes and ears, which produces a state of intoxication bordering on madness, and during which time (and it lasts for hours) the Indians have no command of themselves or of their passions.‡

\* I ascended some of the hillocks in the neighbourhood, and took a number of angles. It appeared to me that the line of division between the basins of the two rivers runs here in a N.N.W. direction.

† The Macusis call these figures "imeun-casa." Those, however, which we find upon rocks, and appear to be the handicraft of an extinct nation, are called "ta'emongkong."

‡ Compare "Journal of the Royal Geographical Society," vol. x., and Humboldt's "Personal Narrative," vol. v., p. 662. It appears, after all, that the chemical properties

Fowls are the only animals which the Indian of Guiana domesticates, and of which he has a large number around his hut; but he raises them only for his diversion, as he makes neither use of their eggs nor of their flesh. Among those which we saw here I was struck by the great number that were perfectly white; and I admired, particularly, the beauty of two cocks, of pure white, and large size.

Towards evening I walked to the Rupununi, which, in an E.N.E. direction, is about a mile and a half distant from Cau-urua. I found it dwindled to the size of the Pirara; its water was dark-coloured, and its bed studded with rocks. The Indians said that its source was distant from hence, in a S. by E. direction, about a day's journey; and that it had its source upon the savannah, among Mauritia palms. It is remarkable that the waters of the Takutu and Rupununi are in their upper courses black, and in the lower whitish. The same may be observed of the Demerara; and I have little doubt even the gigantic Orinoco has black water near its sources. The riddle of this peculiarity, which I have traced in all rivers of Guiana near their sources, is far from being solved. Baron Humboldt is inclined to restrict it to the rivers between the parallels of  $5^{\circ}$  of N. latitude and  $2^{\circ}$  of S. latitude.\* But the waters of the Demerara, the Barima, &c., in a far more northerly latitude, are as black as those of the Rupununi and Takutu near their sources. It would be remarkable if that property were only peculiar to Guiana, taking that territory in its greatest extent, and including what was formerly called Spanish and Portuguese Guiana.

I found the latitude of Cau-urua  $2^{\circ} 28' 25''$  N.; and the difference of longitude about 1 mile W. of Pirara. The direct distance between the Takutu and Rupununi is therefore, in a S.W. direction, 20 miles. The thermometer showed, under the shade of the Parica-trees, at 3 o'clock, p.m.,  $90^{\circ} 3'$  Fahr.; at 7 o'clock,  $80^{\circ}$ ; and 9 o'clock,  $77^{\circ}$  Fahr. On our departure, next morning, it showed, at 6 o'clock,  $73^{\circ} 5'$  Fahr.

14th.—We crossed the rivulet Cau-urua—from which the village has received its name—and took the pyramidical summit of Manette as our guide over pathless savannahs. The settlement having been only lately erected, their paths of communication were not as yet established with the neighbouring villages. Saerari, and the strange rock Dochlopan, formed again the striking object in the landscape; and the dome-shaped mountains of Cursato rose in the western horizon, and were greeted as old

of the Mimosa: are the stimulant powers which exhilarate and, inhaled in superfluity, madden the Indians, although Baron Humboldt doubts it, and ascribes it to the effect of the calined lime which the Otomacs mix with it.

\* "Personal Narrative," vol. v., p. 188.



acquaintances. We crossed, at 10 o'clock, the creek Canaru, which flows into the Rupununi.

The fragments of quartz which covered the savannahs appeared more numerous than on the previous days; sometimes huge blocks of the same formation pierced the soil. Our path was fatiguing in the extreme, and our feet blistered and injured by the sharp-pointed rocks. The greater part of the Europeans were either without shoes, or that necessary article was in such a condition that it no longer afforded the desired protection against the quartz rocks. I found sometimes specimens of a motley appearance, at other times it had a violet coat, like amethyst. The white quartz possessed considerable transparency; but specimens like Scottish cairngorum appear to be entirely wanting in Guiana. The semi-translucent rose-red and milk-white quartz are the most prevailing.

We arrived at half-past 1 o'clock at a settlement consisting of two huts, built on the declivity of the Pinighette mountains. The highest summit of this little chain is about 800 or 900 feet high, and of a pyramidal shape. The huts had such a slovenly appearance that I gladly returned to the foot of the mountains, and ordered a place to be cleared among the high grass for the erection of our tents. While thus occupied, I saw one of our men and an Indian starting backwards, with horror depicted in their faces; a large rattle-snake, which the Indian saw coiled up under a bush they were just on the point of cutting down, was the cause of it. Mr. Goodall had been sitting near the bush for some time, unaware of the dangerous neighbourhood he was in.

The appearance of the sky had changed; although periodically clouded for the last fourteen days, it changed now to an uniform purplish-grey, and portended the approach of the rainy season. I procured some horary angles of the sun in the afternoon; but my wish to determine the latitude could not be executed, the sky being too cloudy.

The water which flows from the south-western side of the Pinighette mountains goes to the Rupununi. On the north-western side the Sawara-au-uru has its source, which, as previously observed, affords a portage between the Takutu and Rupununi. The direction of the small chain is about N.E. by N. and S.W. by S., and their extent 2 miles.

The settlement afforded a pretty prospect over the savannahs; and I noted, with surprise, the natural pyramid of Ataraipu, which even at that distance overtopped the mountains in its neighbourhood, and was a striking object in the landscape. It bore nearly N.E. by E., and was about 45 miles distant from Pinighette.

15th.—We passed between the Pinighette and Manette moun-

tains, and now traversed comparatively level savannahs. The small river Sawara-au-uru turns towards Saeraeri.

We halted at the rivulet Paiwa-yau, or Dutch River, where we refreshed ourselves with a delightful drink of cool water. The mountain Duruanu, the highest summit of which may be 2500 feet, bore, at half-past 10 o'clock, N.  $15^{\circ}$  E., distant a mile. This group is uncommonly rugged and steep, and forms an angle, one of its sides having a S.W. by S. direction, the other standing at W.N.W. A number of groups, only divided by small passes, trend from Duruanu, in a W. by N. direction, towards Ursato, or Cursato. Manoa is the highest next to Duruanu. We stopped near Mount Panissette, opposite the southern point of Cursato: although only a few miles from Tenette, we were so fatigued that we could not accomplish the distance.

16th.—We arrived at Tenette at 10 o'clock; and as we had been day after day on the march since we left Tuarutu, it was necessary to give ourselves a day of rest. On our arrival at Tenette I saw the impossibility of returning in our canoes, the Takutu having fallen still more since we left that place; I abandoned them, therefore, and I succeeded in engaging the necessary number of Indians, in addition to our regular crew, to assist in carrying our baggage overland to Pirara.

17th.—I repeated the experiment of ascertaining the magnetic force, and found the result differed only  $\cdot 92$  by needle L (a), and  $\cdot 24$  by needle L (b), from the one which I obtained on the 22nd of April.\*

18th.—It rained and thundered so severely this morning that it was half-past nine before we could start; and, after an uninterrupted march of 4 hours, and almost under constant rain, we halted on the banks of the river Scabunk or Catu-au-uru.

I observed here a splendid tree of the order Labiatae, which resembled *Hyptis membranacea* in its floral leaves, only that in this instance the floral leaves were of a fine rose-colour, much larger than those of *Hyptis membranacea*, and were connected with the Calices. The flowers are in cusps, and small, and of a bluish colour.†

\* May 17th.—Time of 100 oscillations by needle L (a) 2m. 52s.  $\cdot 08$ . Time of 100 oscillations by needle L (b) 3m. 36s.  $\cdot 45$ . Mean of Thermometrical Observations at Tenette.

Period, 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 h.	9 h.		3 h.	6 h.	
May 16th to 18th . . .	$72^{\circ} 25'$	$78^{\circ} 67'$	$85^{\circ}$	$88^{\circ} 33'$	$85^{\circ} 33'$	Clouded. May 17th; thunder and rain.

† Specimens of this remarkable tree have been sent to Mr. Bentham, the learned author of '*Genera et Species Labiatarum*.'

19th.—Opposite our camp, on the right bank, were numerous plants of the singular *Ionidium Itubu* of Aublet, which diffused its delightful odour. It has an irregular corolla, and the labellum is uncommonly large in comparison with the other petals: its size is nearly 1 inch by 7 lines in breadth. This plant, which the Brazilians call *Praya da praia*, or *Praya branca*, is estimated by them the best remedy against dysentery; and the root is often sold as true *ipecacuanha*, to which it approaches very nearly in its properties.\* According to St. Hilaire, the inhabitants of the Rio Grande do Norte consider the *Ionidium Itubu* a specific against goul.

The river Takutu meandered through the savannahs a mile or two on our left hand. There was no path over these savannahs; and we directed our course to the western angle of the Canuku mountains. We crossed at noon the Sawara-au-uru, which, swollen by the rain of yesterday, ran swiftly over numerous rocks, and rendered our fording it, if not dangerous, at least liable to lose our footing upon the smooth rocks. We ought to have stopped here, but, anxious to reach Pirara before the 24th of May, we continued our march, and soon suffered from want of water. How deceptive proves in such an instance a species of grass, of a light green or rather a bluish colour, which in the distance and influence of the mirage has entirely the appearance of pools of water! We halted near Mount Curatawuburi, which forms the most western point of the Canuku chain. The Indians found some brackish water, with which we were obliged to satisfy our thirst.

20th.—Started at half-past six, and rounded the Canuku mountains, the northern side of which we followed now at a distance of a mile or two. We passed the rivulet Maripa-outé (circuit river), and where we issued from the small forest of Cucurit palms, which girt its banks, we passed a ruined village.

The village near Hanikipang, where I spent several days in 1838 to look for the Urari, and see the preparation of that poison, was abandoned; several of its inhabitants had died, and the others had left, fearing that their sojourn at that place was displeasing to the evil spirit. The same was the case with the Macusi settlement Quariwaka, where, at the period referred to, I found ten Indian huts inhabited; not one was left; only the bare ground denoted that there had once been habitations. However, at a short distance from the site of that village, we saw three huts, built by some of the former inhabitants of Quariwaka: they called their settlement Curata-kin.

In one of the houses we noticed the apparatus of the most famed

\* Kunth's *Handbuch der Botanik*, p. 564. The *Ionidium Itubu* grows in abundance round Pirara.



Urari boiler of the Macusi tribe. Unfortunately he had paid nature's debt; and his numerous utensils, consisting of filters, sieves made of palm-leaves and fibres, pots, &c., were lying unused in the corner of the house, in which he himself was buried. Opposite the village is a remarkable rock of granite, with a rounded piece of white quartz in the middle, which shines, when the sun reflects its rays upon it, like the Kaira in the mountain-chain, which takes its name from it. The Macusi call this rock Uruqua-ka-epping.

21st.—We reached Awarra towards evening, having accomplished this day the greatest distance we had made during our present journey, namely, about 20 miles. If it be recollected that we had to march over open savannahs, and a path covered with fragments of conglomerate rocks, under a noon-tide heat of  $120^{\circ}$  Fabr., it cannot be wondered at that every individual was glad to sling his hammock on our arrival. As many of the Indians who accompanied us resided at Awarra or in the neighbourhood, it caused a great concourse of people, anxious to see their relations after an absence of two months.

We learned here that the military boats, with a supply of provisions for the detachment at Fort New Guinea, near Pirara, had arrived two days previous, and we were most anxious to proceed onwards, under the expectation of finding letters from absent friends; but our limbs refused their duty. However, we started next morning before daylight, and reached Pirara shortly after 8 o'clock, A.M. A large package of letters and a file of newspapers was a most welcome present, which awaited me on my arrival. After an absence of five months from Demerara, information from Europe, or even from the colony, is an enjoyment which only he who is transplanted in a wilderness like ours can appreciate sufficiently.

We had been absent two months from Pirara, and, although exposed to the extreme heat and constant fatigues, no serious sickness had occurred amongst our party, if I except the accident of the canoe-man Henry Petry, who certainly under Mr. Fryer's attention had improved, but was nevertheless found still lingering, and far from being perfectly recovered from his wound.

With the exception of a thermometer, which was broken while being carried with the other baggage over a fall in the Takutu, the instruments which I had with me did not suffer any injury, and the two chronometers (Arnold, No. 6062, and Frodsham, No. 389) presented a good mean rate, which gives me great confidence in the difference of longitude determined between Pirara and the sources of the Takutu.\*

\* The difference of longitude between Pirara and Tenette was found to be  $29^{\circ} 13' W.$ , by horary angles of the sun; and between Tenette and Pirara, or by measurement,

We were sufficiently recovered from our fatigues to do every honour at our command, at this spot so distant from all civilization, to the birthday of Her Most Gracious Majesty. This was the third which I celebrated at this village, and where the twenty-one guns fired by our small battery told the surrounding Indians that the Paranaghiri had occasion to celebrate that particular day to their heart's content.

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III.—*Extracts from a Journal kept while travelling, in January, 1841, through the Country of the Mamásení and Khógilá (Bakhtiyári), situated between Kázerún and Behbahan. By BARON CLEMENT AUGUSTUS DE BODE.*

VON HAMMER has remarked, in his *Memoir*\* on Persia, that the best geographical account of the road through Khúzistán is the Itinerary of Timúr's march given in the history of that conqueror, by Sheref-ed-dín 'Alí, of Yezd. But that Itinerary occupies only thirteen lines in the translation of Baron Nerciat. The following notes made during a journey through that country in the beginning of the year 1841 may help partly to complete the account given in the History of Timúr, and rectify a few errors into which Von Hammer has unavoidably fallen. As the town of Kázerún and the ruins of Shápúr have already been described by preceding travellers, I shall not stop to enlarge upon them, but proceed at once to the country of the Mamásení, a tract almost wholly unknown to European geographers:—

*January 21st, 1841.*—After visiting the cavern which contains the colossal statue† of Shápúr, among the hills bearing that name, and exploring the labyrinth by torch-light, I descended into the valley at 10 a.m., and followed the course of the river of Shápúr upwards in an E.N.E. direction. The stream is here almost choked up with rushes and other aquatic plants.

At 10 h. 45 m. we entered the valley of Kúh-méréh, or Desht-i-Ber, and turned N. This valley lies between the chains of mountains called Pír-i-zen and Kútel-i-Dohter, and may be a farsang or a farsang and a half‡ in width: it is the same valley that is crossed in going from Shíríz to Kázerún, near Miyáneh

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29° 23' W. For the determination of the latter difference I used the mean rate of the chronometers, deducted from horary angles on our departure (March 26th) from Pirana, on our return to that village (May 22nd).

\* Translated into French by the Baron de Nerciat and published in the Paris Geographical Society's '*Recueil de Mémoires*,' tom. ii., partie 2de, p. 300.

† Sir Wm. Ouseley's *Travels in Persia*, vol. i. pl. xix.

‡ About  $\frac{3}{4}$  or  $\frac{5}{4}$  miles. The farsang is from  $\frac{3}{4}$  to 4 miles: perhaps Macdonald Kinneir's estimate ( $\frac{3}{4}$ ) is the truest (Sir W. Ouseley's *Travels*, vol. i. p. 11).

Kútel, about 5 farsangs (about 20 miles) to the S.S.E. of the place where we now were. I here took the direction of the river of Shápúr.\* It comes from the chain of Pír-i-zen, which is here E. by S., and after traversing the valley of Kúh-méréh, forces a passage through the Kútel-i-Dokter, near the bas-reliefs of Shápúr, waters the beautiful plain of Kázerún, and is lost behind the mountains of Kumárij. The villages of Nudún and Sungul, belonging to the district of Kázerún, are in the mountains to the E. At 11 h. 15 m. we swerved a little to the N.W., and at noon reached the encampment of Jehángir Khán, Mamáseni, chief of the tribe of Dushmen-ziyári. This place of encampment is called Chenosheján. My guides from Kázerún delivered me over to this chief, received from him a certificate of my having arrived safe and sound in his tent, and quitted me. I adopted the method of causing myself to be passed, like a bale of goods, from hand to hand, during the whole of my journey through this wild tract of country, and had every reason to be satisfied with the effect of this precaution, which made the last person who had given a certificate of my being alive responsible for my safety.

The residence of Jehángir Khán consisted of a square tower constructed of clay, whitewashed externally, furnished with loopholes, and surrounded by huts of the Mamáseni, made of reeds, and by black tents covered with mats. The Dushmen-ziyári, since the death of their principal chief, Mohámmad Rizá Khán, executed at Shiráz, in 1840, by order of its then Governor, Prince Feridún Mirzá, form three divisions; one under the command of Jehángir Khán, another under that of Hájí Husein Khán, and the third under the orders of Aghá Khán, son of the late chief.

Chenosheján, formerly the Gerimesir or winter quarters of Mohámmad Rizá Khán, is a plain of considerable extent, which is bounded on the E. by the prolongation of the Pír-i-zen; from N. to W. by an offset of the same chain, and on the S. by the termination of the Kútel-i-Dokter. The following circuit may be made on the road from Shiráz to Bú-shehr, in order to avoid the descent of that pass,† which is terrible for a train of artillery. On descending Pír-i-zen, turn to the right through the valley of Desht-i-ber,‡ cross the plain of Chenosheján, which communicates with it, and thence pass into that of Shápúr, which forms a part of the vale of Kázerún. This circuitous road has the shape of a horseshoe, and presents no obstacles for the transit of baggage, but it is 12 farsangs (about 45 miles) in length, while the other is

\* The *Grazia* of Nearchus (Vincent's *Voyage of Nearchus*, p. 368), now called Khíst, from a town on its banks.—*Ouseley's Travels*, vol. i. p. 261.

† *Ouseley's Travels*, vol. i. pl. xx., and map in vol. ii.

‡ Abdál in Ainsworth, from a village of that name.



only about 4 or 5 farsangs (15 or 16 miles). In the valleys, as well as on the sides of the mountains, we find the *balût*,\* a species of oak, the acorns of which are ground and made into a paste, which is used for food by the *Pliyâts*. The very steep summits of the *Pir-i-zen* are all peaked, and beyond them to the E. the chain of *Ardekân* rears its snowy head.

22nd.—On the following day I mounted my horse at 7 A.M., accompanied by twelve *Pliyât tufengchi*,† who were to escort me to the next station. The direction of the road was N. till we had quitted the *balût* woods and reached the heights of *Múné-nahl* by a very stony road. This is the boundary of the district of *Kâzerûn*, which I had just quitted, and that of *Fahliyân*,‡ which I now entered. On descending from *Múné-nahl* we entered a valley running to N.N.E. and full of oaks, and passed a spring of fresh water, named *Mei Hûr*, on the left side of the road. At a quarter before 10 A.M. we reached a *bastengâh*, a promontory of the mountains, which was pointed out to me as marking the place where the *Mamâseni*, and their neighbours the *Borî*, of the *Khôgilâ* tribe, issue from their ambuscades to attack caravans. The place is very wild and admirably adapted, it must be confessed, to this kind of sport. In the mountains on the right is the beautiful valley of *Bum*, with its vineyards and groves of pomegranates; while behind the mountains on the left, a contrast which Nature often delights in forming, there is a desert tract called *Mohur*, extending as far as the Persian Gulf, inhabited only by lions, wild-boars, and antelopes.

At a quarter past 11 A.M. we reached the plain called *Sahrâi Behrâm*, at the entrance of which I found sculptured on a rock a bas-relief representing that Prince, his face turned to the beholder, seated with two erect figures on each side of him. *Behrâm* is recognised by the two-horned tiara on his head, with broad ribands floating over his shoulders, as is usual on monuments of the *Sâsâni* kings. He has also the large head of curled hair which distinguishes the portraits of the Sovereigns of that dynasty. The two figures on his left wear on their heads a kind of mitre, like the *Môbids* or High Priests at *Persepolis*, and have beards. They are in profile with their faces turned towards the king. The figure on the left holds in his hand a straight sword with the point towards the ground. Two figures on the right, also in profile and turned towards *Behrâm*, have no beard, and wear caps such as are seen on some coins of the *Arsacida*; their hands are joined together and raised up in a supplicating attitude. All the figures, except that of the Prince, have full

\* Perhaps the *Quercus Ballota*, common in Spain, Greece, and Asia Minor.

† Fusiliers.

‡ *Fahliyân*, pronounced *Fahliyûn*.

puckered trousers. This is all that can be distinguished on these bas-reliefs, for unfortunately neither the hand of time nor that of the Arabs has respected this ancient monument. It should be observed that the workmanship is much coarser than any met with at Naḵshi Rústán, Naḵshi Rejéb, or even Shápúr. Perhaps the nature of the rock is in part the cause of this, or it may be that, after the death of Shápúr, the fine arts began to decline in Persia. At the foot of the rock on which this sculpture is cut, is the source of the river of Behráw, which runs towards the plain in a N.W. direction; but like that of Shápúr, it is almost choked up with rushes. Naḵshi Behráw, surrounded by trees, water, and verdure, is a very picturesque spot. I stopped here to make a drawing of the bas-relief, and it was noon before I mounted my horse again. Most of my guides quitted me here, because great hostility prevails between the Dushman-ziyári and the Bekesh, whose encampments we were now approaching. Only three of them ventured to accompany me, in order to carry back to their Chief the usual certificate, but they left their arms with their comrades, by way of assuring their neighbours that they did not come with any hostile intentions; I, at the same time, made myself responsible for their sustaining no injury.

On quitting the rock of Naḵshi Behráw the plain widens, and after an hour's ride we passed a sulphureous spring on the right side of the road, near the mountains. At a quarter before 2 P.M. we passed near the ruins of Nóbend-ján, formerly a flourishing city, at which Tímúr halted before he laid siege to Ḳal'eh Sefid.\* Nóbend-ján was built by Shápúr I., destroyed by Abú Sa'íd, rebuilt by the Ja'ulí, Atábeg of Lurí Buzurg (Lur the Greater), to be again ruined. Nothing now remains of it but heaps of stones and hillocks scattered over the plain: an eloquent lesson on the instability of human things, but wasted on the desert. Near these ruins is the source of a small stream, which discharges itself into that of Behráw.

At the distance of a quarter of an hour's march from the ruins of Nóbend-ján is the Fort of Núrābād, built in the plain and flanked by four bastions. On every side of it are the reed-built huts and tents of the Mamáseni belonging to the tribe of Bekesh, whose chief is Murád Khán. To the right of Núrābād there is a small Imám-zādeh,† which has iron doors, and on an eminence to the left the remains of old Núrābād.

The Sahrāi Behráw (plain of Behráw) may be about 3 farsangs (12 miles) long from E. to W. and 2 farsangs broad. Two farsangs (8 miles) to the N.E. are the ruins of Ḳal'eh Sefid, so frequently

\* White Castle. See 'Pétis de la Croix, Histoire de Timur,' bee. ii. p. 166.

† Sepulchral chapel of a saint.

mentioned by Persian poets and historians. The hill on which the citadel is built is completely isolated. It has a broad base, perhaps a farsang and a half ( $5\frac{1}{2}$  miles) in diameter, and does not become steep till near its summit, where it presents an abrupt rampart, and its crest is said to be only accessible by one path. Being anxious to reach Fahliyân, I was not willing to go 4 farsangs (upwards of 15 miles) out of my way to visit Kal'eh Sefid, which has been already described by Mr. Macdonald Kinneir.\*

From Nûrâbâd the road passes northwards, first through the plain and then along the heights which separate the *Sahrâi Behrâm* from *Sha'b-bevân* (Tent-pole defile).† The thickets of box on the plain afford shelter to wild boars, pheasants, and the *turaj*, a kind of heath-cock, but larger than ours, and black with white spots. These birds are also found in the valley of *Gurgân* (Wolves) in *Tarcomania*, and in the Russian province of *Kara Bagh* (Black Vineyard) as well as in *Kabardah* to the N. of the great chain of *Caucasus*. At half-past 2 p.m., having reached the culminating point of the mountain, I looked down upon the beautiful valley which disclosed itself below, watered by a river and enamelled with flowers. I did not expect to find so many in bloom in the month of January. To the N. two ranges of hills rise in the form of an amphitheatre; the foremost bend towards the E. and almost touch *Kal'eh Sefid*, being separated from it only by the defile through which the river *Sheker-âb*, or *Ab-shûr*, coming from *Ardekân*, forces its way; while the more distant and snow-covered hills pass behind *Kal'eh Sefid* and afterwards unite with *Pir-i-zen*. At the height of *Mâné-nahl* they turn abruptly to the E. in the direction of *Shirâz*.

While descending into the valley my sense of smell was agreeably affected by the perfume of the narcissus, spread like a white carpet over the field for the space of many miles. All our party pushed into this rich parterre up to their horses' girths, to enjoy the fragrance as much as possible. For my own part, I felt at first some scruple in thus treading down these beautiful and delicate productions of nature; but I ended by doing as the others did: so easy is it to yield to a seductive example! This is not an exaggerated description of the charms of *Sha'b-bevân*, which is said by the Arabian and Persian poets to be one of the four terrestrial paradises.‡ This valley is interspersed with cultivated fields, which

\* *Memoir of a Map of Persia*, p. 73.

† *Sha'b-bevân* is an Arabic phrase, and may be rendered "entrance-defile," as *Bivân* or *Buvân* signifies the pole which supports the curtain serving as a door to the Arab's tent, and marking its place: but *Golius* says *Buvân* is the name of a Persian tribe.

‡ The other three are the *Soghd* of *Samarqand*, the *Ghuṣṣah* (Orchard) of *Damascus*, and the *Nahr-i Olṣṣāh*, i.e. the island between that river, the canal called *Nahr Mo'kal*, and the *Tigris*, a little to the S.W. of *Bagrah-Golius* in *Alfergan*.—p. 120.



produce cotton, rice, barley, and wheat; but wherever the ground is left fallow, the narcissus resumes its empire, and seems to have fixed on Sha'b-beván, and on the plains of Behbebán, as its favourite places of abode.

We followed the valley in a N.N.W. direction, and at a quarter before 4 p.m. reached Fahliyán,\* situated at the northern base of the connecting range of hills which we had crossed in coming from Núrābād. Our distance this day was between 7 and 8 farsangs (29 and 30 miles), in a N. direction.

Fahliyán is a little paltry town, of at most sixty or seventy houses; but it is enclosed by walls, now in ruins, which show that it was formerly not quite so insignificant. In the time of the Sefeviyeh dynasty it had 5000 inhabitants, a mosque, and four public baths. The district of Fahliyán extended from Múné-nabl on the S. to Báshl on the N.W., and from Ardekán on the E. to Khisht on the S.W. The Mamáseni have by degrees made themselves masters of almost all the arable land formerly possessed by the inhabitants of Fahliyán, who complain bitterly of the exactions to which they are continually subjected. The town is supplied with water by a canal cut through the hills from the snow-capped chain beyond Kal'eh Sefid, for a distance of, perhaps, 4 farsangs (14 miles). The water of the Ab-shúr being, as its name implies, brackish, it can only be used for irrigating the fields. The soil is here very fertile, and water abundant; but hands are wanting for the cultivation of the land. The fields artificially irrigated yield from 25 to 40 for 1 in the winter crops: the proportion is lower in the lands called *dein* (debt), and *bakhs* (deficiency), i.e. fields watered only by rain and dew, and not artificially irrigated. Rice which is sown yields less than that which is planted; the produce of the latter being to that of the former, in good years, as 150 to 1. Sesamum (*kunjud*) is also cultivated here, and returns 100 for 1.

Fahliyán is surrounded by fine palm-trees, and has a fort in ruins on the summit of a small hill. As a precipice rises close behind it, I suppose that the heat in summer must be intolerable. The duties paid by Fahliyán to the government of the province of Fárs do not exceed 1000 *tóman*s (about 480*l.*).

23rd.—Having been informed that there were some ancient inscriptions in the neighbourhood, I went to see them, accompanied by the brother and son of Mírzá Abú-l Kásim, governor of the town. Our route was to the N.E.; and, after fording the Ab-shúr, we reached, at the end of an hour's ride, the *Imám-zádeh* of Sháh Abdu-l,† where I found nothing but some frag-

\* Pronounced Fahliyán.

† Perhaps 'Abdu-lláh, as 'Abdu-l, i.e. "Servant of," cannot be used alone.

ments of white stone, on which there are Cufic inscriptions. This Imâm-zâdeh stands near an isolated hill called Kal'eh Siyâh (Black Castle), the counterpart of Kal'eh Sefid (White Castle).

Having mounted again, at 8 h. A.M., I crossed some well-cultivated fields in a W. by W.N.W. direction. At 9 h. A.M. I passed the ruins of Chehâr Bâzâr (Wednesday Market), a town 1 far-sang N. of Fahliyân. Farther on is the Tepeh, or hillock of Senjer Mohammed Belûj; on which the chief, so named, made a stand against Nâdir Shâh; for which piece of temerity, on the return of that conqueror from Baghdâd, he paid with his head.

At 10 h. A.M. the hills came close to the road, which here forms the boundary between the district of Fahliyân and the territories of the Mamâseni of the tribe of Rustem. But before I take leave of the valley of Sha'b-bevân, I will add a few words on the river by which it is watered. The Ab-shûr, or Sheker-âb, rises in the snowy mountains of Ardekân, to the E. and N.E. of Kal'eh Sefid, and passes through the whole length of the above-named valley, winding from E. to W. It then forces its way through the hills to the W. of Fahliyân, and having joined the river of Behrâm, crosses the wild tracts called Mohur, and discharges its waters into the Persian Gulf at, I believe, Bender Rîg.\* The Ab-shûr is not fordable everywhere; and the ruins of a bridge over it are still to be seen near Kal'eh Siyâh. Its water, as has been already mentioned, is brackish.

At 10 A.M. we entered the valley of Ser-âbi-Siyâh (Black Water Head) lying between two parallel chains of hills. At first it is well cultivated; but farther on, it is covered with high grass, and becomes a mere swamp, which abounds with game. Many springs here burst forth from the ground and the rocks. There are roads along the base of the hills on either side of the valley: I chose that on the left, as being the shortest; but when the brother of Khân 'Ali Khân, chief of the Rustemî, met us (about 11 A.M.), he persuaded me to cross over to the other side, pretending that the road on the right was the better of the two. Probably he expected to meet his brother on that side. Khân 'Ali Khân soon made his appearance, accompanied by a crowd of men on horseback, all well armed and mounted. This parade was intended, no doubt, to convince the Frengi of the importance of the chief, and of the strength of his tribe. The Persians are great braggarts. The Khân accompanied me part of the way.

We crossed many springs, bursting out almost under our feet, and soon afterwards augmenting the volume of the neighbouring lakes and pools, which appear to have no outlet, and are very deep. The reeds and grass which cover these marshes are said

\* The Rhogônis of Nearchus. (Arrian, *Indica*, vol. xxxix. p. 355; Vincent, *Voy. of Nearchus*, p. 370.)

to be the hiding-places of many lions, wild boars, and buffaloes, as well as the cover for vast quantities of game and all sorts of water-fowl.

Before we separated, Khán 'Alí-Khán showed me an Imám-zádeh near the road, beside which there was a grave-stone bearing a Cufic inscription; a proof that this tract was formerly inhabited by Arabs. On quitting him I forded the river Shír (Milk), or Abi Sha'ab (Muddy Water), one of the streams mentioned by Sherif-ed-din,\* in his account of Timúr's march. It comes from a valley lying to the N., where the Rustemí chief encamps, and takes a S.W. direction, leaving on the left the large village of Ser-ábi-Siyáh, with a fort on a hill, where 'Alí Veís Khan, the supreme chief of the Rustemí, ordinarily resides. When I passed he was at Shíráz.† Half an hour further on, always in a westerly direction, we came to a steep kútel;‡ after which, bending a little towards W.S.W., we crossed the dry bed of a stream, entered the julgéh or valley of Basht, and at a quarter before 6 P.M., reached the house of Allah Kérím Khán, who resides at Basht, and was then acting as chief of the Bori, a tribe of the Khógilú, during the absence of his brother Sherif Khán.

I am not sufficiently versed in the history of the Arabs to say whether these new conquerors subjugated these tribes, as the Sásáni princes had done before them; but the towns of Shápúr, Nóbend-ján, and Fahliyán, as well as the Imám-zádehs with Cufic inscriptions mentioned above, prove sufficiently that both the one and the other exercised a considerable authority in this country. It has been already observed that, at the flourishing epoch of the Sefeví dynasty, this country formed only one district, of which the chief town was Fahliyán, situated between Kázerún and Behbehán. In more modern times, when the government of Fárs was administered by Huseín 'Alí Mirzá, son of Fet-h 'Alí Sháh, the Mamáseni were much addicted to pillage. The leader, who gained the greatest celebrity among them in this calling, was Veli Khán, of the Bekesh tribe. From being nothing more than a Pish-khidmet, or valet-de-chambre, of the Prince Fermán-fermá (Viceroy) of Fárs, he became his son-in-law. That dignity, however, did not prevent him from giving himself up to the trade of plundering, carried on in the period of misrule and disorder which in the southern provinces of Persia followed the death of the old king. The communication between Bú-shehr and Shíráz was in consequence almost cut off, till Manúsbehr Khán, formerly governor of Fárs, checked it in some degree by seizing Veli Khán

\* Hist. de Timur Bec, par Pétis de la Croix, vol. ii. p. 186.

† The Ab-Shír is the boundary between the Mamáseni and the Khógilú; but there is also a strip of neutral ground between them.

‡ A precipitous hill.



and his eldest son, Boghir Khán, after having driven the latter out of the forts of Gulí guláh.\* These two robbers have been from that time till now imprisoned in the citadel of Tabriz; but their popularity in Fárs is so great that their names, deeds, and exploits are perpetuated in songs, and pass from mouth to mouth among the P'liyáts.

I here subjoin a table of the principal divisions of the Mamáseni tribe, with the names of their chiefs, places of encampment, and the approximate number of their families:—

MAMASENI TRIBES.

No.	Principal Divisions.	Some Subdivisions.	Names of the Chiefs.	No. of Families.	Places of Encampment.	Remarks.
1.	Rustemí .	{ . . . . Mohammed } { sálibí . }	{ 'All Véis Khán, and Khán 'Alí Khán . . . . } Taghí Khán .	100	Ser-áhi-siyáh. { Dágar, in the { Plain of Behrdm.	The Rustemí are esteemed the bravest, and can bring 200 horsemen, well armed and mounted, into the field.
2.	Bekesh .	{ 'Alí-reud .	Muráá Khán . . . . }	100	{ Nár-Khál. { Teugí Shápúr.	Next come the Bekesh; between these tribes there is much jealousy and hostility.
3.	Dushman-siyáfi .	. . . .	{ Aghá Khán, Hájí Hussein Khán, Jihángír Khán }	100	{ Arlekán. Near Shápúr. Chennahján.	The two remaining tribes, though nearly equal to the others in numbers, are poorer and less powerful. One part of the Dushman-siyáfi is under the protection of the Rustemí.
4.	Jel . . . .	. . . .	Fet-hu-Uah Khán	100	{ Near Kal'eh- { sefid.	

A tax of 7000 tóman's (about 2800*l.*), payable to the governor of Fárs, is now levied on the Mamáseni.

Básht resembles the castles of the old feudal barons in Europe. It consists of the chief's fort, enclosed by high walls and flanked with turrets. All around are groups of the habitations of his vassals, who live under the shadow of his protection, and furnish him with the means of resisting his enemies. I found my host, Allah Kerim Khán, very hospitable and communicative; he came with his son to pay me a visit, and entertained me till a late hour with the history of the implacable feuds by which these mountaineers are divided, and the intestine wars to which these feuds give rise. I may remark, by the way, that in my frequent intercourse with the migratory hordes in Persia, I generally found their character marked by much frankness, mixed up with a great deal of cunning. These qualities may appear at first sight

\* These two forts, which are near each other, are 3 farsangs (15 miles) S. of Behbehán, and not, it is said, inferior in strength to Kal'eh Sefid.

incompatible with each other, but this extraordinary combination of opposite elements may be accounted for, partly, by the simple and patriarchal life which these chiefs lead in the bosom of their families, and partly by the necessity which they are under of being constantly on their guard in order to defeat the machinations of their adversaries, or from their own inclination to encroach upon their neighbour's property.

24th.—On quitting Bāsht, at a quarter before 8 in the morning, we first mounted a very steep hill, which commands it on the S., and then descended, by a very stony road, into a valley full of oaks, wild almond-trees in blossom, and the kúh-nár,\* a tree peculiar to the S. of Persia; our road having a W. direction, and passing between two chains of high mountains. After travelling 2 hours we again came to an ascent, after surmounting which we reached, by a long descent, at 11 A.M., the dry bed of a river coming from the snow-capped mountains of Huinā, to the right of the road, and W. of Bāsht. At the time when the snows melt, the river is full of water, and flows on, with a S. course, till it issues from the valley, when it turns to the S.E., loses itself in the Mohur, or perhaps unites with the Ab-Shūr, and thus reaches the Persian Gulf. For some time we followed its course, and on leaving the valley turned to the W., and kept in that direction till we reached the station of Doghúmbézún,† about 8 farsangs (27 miles) from Bāsht. We arrived there at half-past 3 P.M., having rested for half an hour by the way.

Throughout the whole tract which we had now crossed there are no habitations, nor, at present, water; but it was not so formerly, for along the side of the road there are the remains of kanáts, or underground channels; and, 2 farsangs before the traveller reaches Doghúmbézún, the ruins of a kárvánserāi are passed, and further on there are the relics of a village. The soil is in general full of pebbles, and it is only at wide intervals that one meets with fields cultivated by the Khógilú, who inhabit the hills. The high mountains to the N. are thinly sprinkled with trees, as is the valley of Doghúmbézún; but the chain which stretches to the S. is more barren and lower than the N. line of hills.

Doghúmbézún is a ruined kárvánserāi, built near a spring of water, in a perfectly wild and desert place. At some distance, among the hills, is the Kāl'eh Arú, a fort where the chief of the Bó Rahmet, one of the subdivisions of the Khógilú tribe, resides. Our halting-place not being considered very secure, on account of the predatory character of the mountaineers, we continued

\* The fruit of this tree, something like that of the service (sorbus), is yellow when ripe, slightly acid, and pleasant to the taste.

† Doghúmbézún—the indissoluble knot?

under arms till night, and started again at 3 o'clock in the morning of the 25th.

25th.—The distance from Doghumbézún to Behbehán is generally said to be 12 farsangs (45 miles); but I doubt whether it be so much. For the two first farsangs (7 miles) we passed through the same valley as we had followed on the preceding day; but the mountains then close in, and the road leads for more than a farsang through a very rugged tract. We next entered a charming valley, shaded by clumps of trees, enclosed by high mountains, and watered by the river Shem Si-'arab,\* which winds its course through the hills in a S.W. direction. Having left the ruins of a *kárvánserái* on the right, we crossed the river, and entered the plain of Lishter. It was in these meadows that a part of the stud of the former *Fermán-feriná* (governor) of Fárs was kept, on account of the abundance of grass with which they are covered in the spring. It was here that *Timúr* encamped, according to his historian, *Sheref-ed-dín*; in the translation of whose work this place is called *Lashter*.

After leaving Doghumbézún, till 8 A.M., our course was almost always W., but at Lishter we turned to the N.W. At half-past 8 we left a square tower in ruins on the left, as well as an *Imám-zádeh* near the mountains; and at 11 A.M. we arrived, by a winding road, at the bank of a large river, after having crossed two inconsiderable ones.

The river which I have just named issues from the snowy range in an E.N.E. direction, and has a broad and pretty deep bed, and is called (the river of) *Kháir-âbád*, from a large village, now in ruins, on its opposite bank. It is the *Abi-shirín* (sweet-water) mentioned in *Timúr's* route, the *Arosis* of the ancients, and the river of *Hindián†* of the present day. From the *Kháir-âbád* River to Behbehán is a distance of 3 farsangs (11 miles): the first in a N.W., direction, across a very rugged country, abounding in *mica*; the two last, westward, over a level, well-cultivated country.

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\* Probably the *Brizana* of *Nearchus* (*Vincent*, p. 373).

† Also, but erroneously, called the *Táh*.



*Notes on a Journey, in January and February, 1841, from Behbehán to Shúshter; with a Description of the Bas-reliefs at Tengi-Sauleh and Mál Amír; and a Digression on the Jád-dehí Atábey, a Stone Pavement in the Bakhtiyári Mountains.*  
By BARON CLEMENT AUGUSTUS DE BODE.

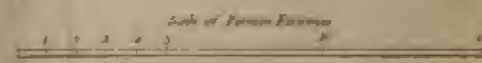
DURING my short stay at Behbehán in January, 1841, I learned, from Mirzá-Kúmó, of the Khógilú tribe, governor of that place and of the adjacent country, the existence of some curious sculptures and inscriptions, about 7 Persian farsangs (26 miles) to the N.W. of Behbehán, among the Behméi mountains. As no European traveller had yet, to my knowledge, penetrated so far in that direction, or even alluded to these sculptures, I was anxious to ascertain whether the encomiums lavished on them by my host and his friends were merited. I thought that, even if their praise was exaggerated, the discovery of some remains of antiquity, however insignificant, would prove welcome, and add to the scanty knowledge we possess of the ancient monuments of Elymais. This feeling made me change my intention of pursuing the lower road, which the late Major-General M'Donald Kinneir had taken on his way to Shúshter, and I resolved to follow a more northerly direction, among the mountains, taking Tengi-Saulek by the way. I therefore begged Mirzá-Kúmó to furnish me with a trusty guide, to show me the valley in question, and then take me straight to the chief of the Bakhtiyári-Cheharleng, Mohammed Tághí Khán, through whose territory I would have to pass before I could reach the town of Shúshter. My hospitable host not only readily acceded to my wish, but kindly provided me with horses for myself and my servants, as those I had brought from Shíráz could go no further, and in this unsafe part of the country no muleteers could be found.

January 28th, 1841.—I left Behbehán, accompanied by my host and a long train of attendants, mounted on fine Arab mares. The road lay across a plain, which extends from E. to W. for upwards of 9 farsangs (29 miles), and has a black fertile soil. The air was pleasantly warm, and impregnated with the balmy fragrance of the nargis (the narcissus), which sprang up in wild luxuriance, and covered whole fields with a white sheet in the direction of the ruins of Arreján.\* Mirzá Kúmó soon turned back, but not before he had committed me to the care of his nephew, Mirzá 'Ali, whose guest I was to be for the night at the village of Kaí-Káús, 2 farsangs (7½ miles) N.W. of Behbehán.

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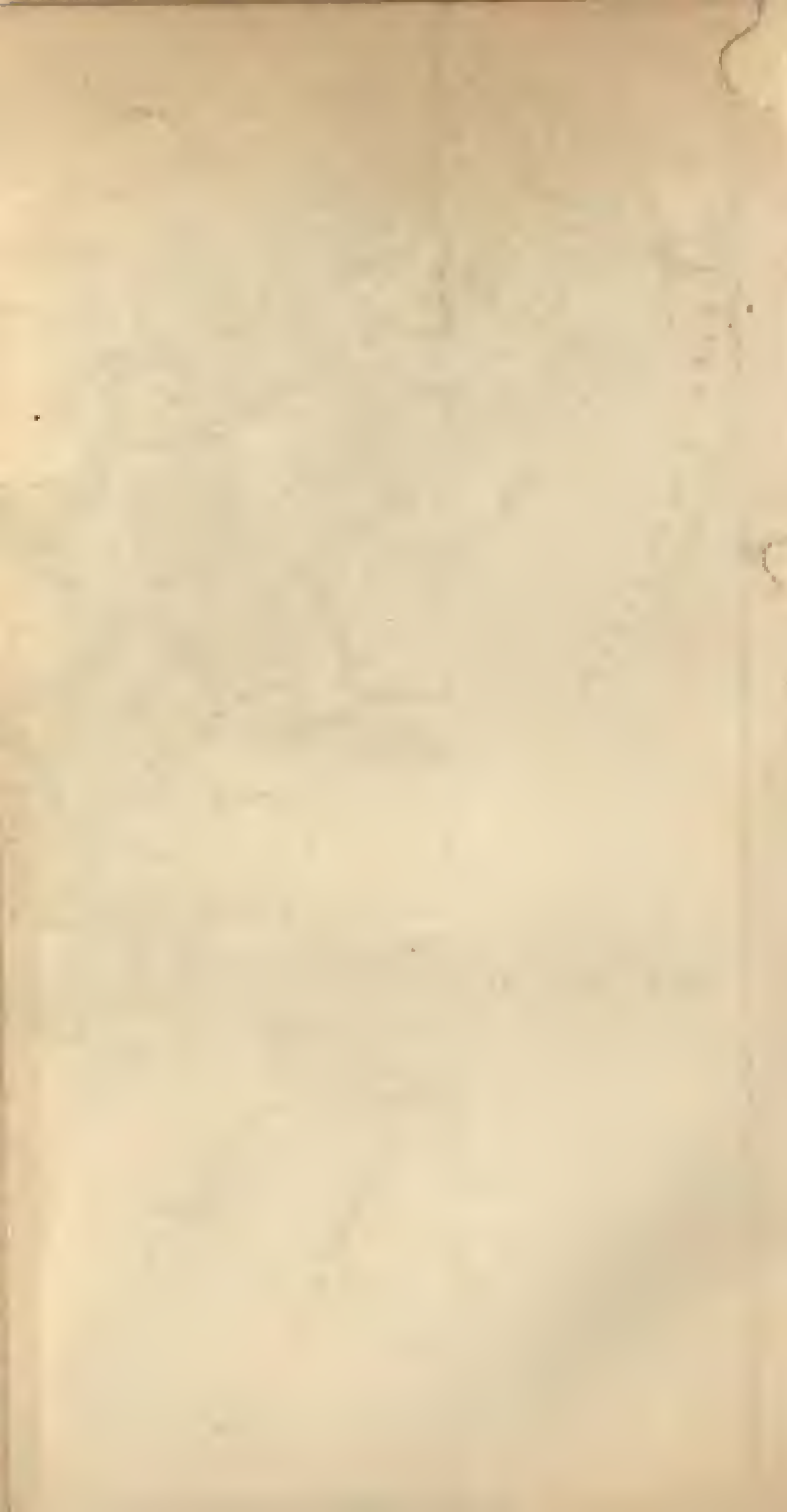
\* ارجان or ارخان Arreján, or Aregbán.—Jihán nutrá, p. 272.

MAP  
to illustrate  
Baron C. A. de Bode's  
route from  
**KAZERUN TO SHUSHTER**  
through the Countries of the  
Mamaseni, Khoguli & Bakhtiyari Tribes  
in 1841



The Indian route is coloured — Red —  
W. Arnold's journey — Blue —  
Bakhtiyari — Orange —







About 1 farsang from the latter place we crossed the River Kurdistan,\* which is fordable at this spot, leaving on our right, a little up the stream, the village of Kazim, and on the left the villages of Hórestán, Kurdistan, and Huseinabád. The River Kurdistan takes its rise in the hilly country of Serhad-Chenár,† to the N. of Behbehán; and passing by Deh-Desht,‡ the summer residence of Mirzá Kúmó, 8 farsangs (26 miles) N.E. of Behbehán, it enters the narrow valley of Tengi-tekâ,§ after which it opens to itself a broader passage between the mountains of Bolenghès and Howíz, and flows in a deep and wide channel, with high banks on either side.

Near to this spot are the remains of two bridges, a short distance from each other: Pul-i-Dokter and Pul-i-Bégum (the Bridge of the Damsel and of my Lady). Both are of stone and brick; and to judge by what time has spared, they must have been built on a grand scale. Some of the platforms of the piers from which the arches sprang are still standing on the right and left banks of the river, but the rest have been nearly all carried away by the force of the current. There is a large building which formed part of the bridge of Pul-i-Dokter, two stories high, with two rooms in each. Both must have been below the road over the bridge. Numerous ruins of the Sásánian times are scattered along the banks, especially on the left bank of the Kurdistan.

This river, after leaving the Behbehán district, flows in a north-westerly direction, and joining, below Rám-Hormuz, the Tezeng or A'laí River, which comes from the eastern hills, it empties itself into the Kuren, under the name of Jeráhi,|| in the Cha'b (Ka'b)¶ country.

Mirzá 'Alí treated me with some fresh dates, which, next to those of Fesá in Fárs, I found the most delicious I had ever tasted, but rather too luscious, and very clammy. His village is surrounded by palm-trees, but the season was over, and all the dates already gathered by the peasants.

29th.—At three quarters to 7 A.M. we were again on horseback. My host accompanied me part of the road, to show me some ancient ruins. In the neighbourhood of the village of Kaí-

\* The river of Kurdistan, from the village so named. The common Turks and Persians have no notion of giving a general name to any but very large rivers.

† Ser-haddi Chínár (Plane-tree boundary).

‡ I learned from Mirzá Kúmó that close to Deh-Desht are some very old ruins.

§ Straits of the deep waters: *tek* signifying deep in the ancient dialect of the country, and *â* an abbreviation of *ab* among the Kurdish and Súr tribes. Tang-ta-koh in Arrowsmith's map.

|| The Kurdistan, or Jeráhi river, is the Tâb, as I shall prove in a separate note.

Teráhi (Jeráhi, noisy, جرای for جرامیه) in Major Rawlinson's 'Itinerary to Khúzistán.'

¶ Ka'b in this tract, pronounced Cha'b. See Niebuhr.

Káús are the remains of a town which goes by the same name. In the midst of a great quantity of rubbish and loose stones, rises a lofty pile, known to the inhabitants by the name of Píl-Khánéh, or Elephant-House. It consists of two walls, with a high gateway in each, over which is a window. The era of the building I believe to be Sásánian.

At half-past 7 we came to an old square building in the form of a Muselmán Imám-zádéh (saint's sepulchre), and probably of Arab origin. The inside is vaulted, and round the building are some straggling tombstones. The high hill of Bodil is to the right, bearing N.N.E. After we had crossed a low range of calcareous hills, we reached, at 8 o'clock, the village of Chárró, in the neighbourhood of which, on a plain, are two ruined edifices, built of freestone and white mortar. The larger of these buildings has a long apartment, with three high doorways leading into ruins of inferior dimensions. It has no roof.

Continuing my march in a N.N.W. direction from the previous night's halting-place, at 9 A.M. I reached Táshún.\* The chief of this place came out to meet me with half a dozen armed horsemen. Táshún at present is but a poor place; but the ruins of houses, bázárs, palaces, and baths, scattered in all directions, attest it to have been formerly a considerable town—perhaps during the dominion of the Átábegs of Luri-buzurg, as the buildings are apparently modern. According to the natives, however, there exists a tradition that Táshún is the spot where the patriarch Ibráhím, or Abraham, was thrown into a burning furnace by Nimrod, the "mighty hunter before the Lord;" and in corroboration of this legend they adduce the name of the town of Táshún, which is derived from *اتش* (Atash), meaning fire. Major Rawlinson, in his 'Notes on Khúzistán and the Lur Country,' mentions that the same legend is attached to the place of Manjáník in Bágh-i-Málek, near the Mungasht hills. I may here observe that I have visited the last-mentioned spot, but found no remains of a remoter date than the Sásánian era; and I apprehend that Major Rawlinson must have been misinformed by the natives of the existence of an Babylonian remains there. I shall not, however, be positive, as I could not go over the whole ground, which is sufficiently extensive.

Táshún has a spring of very clear water, where sacred fish are kept. This place has five villages under its jurisdiction, and pays yearly to the governor of Behbehán the sum of 500 *tó máns*, equal to 250*l.* sterling. The produce of the land consists chiefly of wheat, barley, Indian corn, kunjút (properly kunjéd) or sesamum, peas, beans, cotton, &c. The peasants dispose of their surplus

\* Jarzoon in Kinneir, p. 437.]

produce to the wandering tribes that live in the neighbouring mountains.

The orders of Mirzá Kúmó had preceded me here; and the chief of Táshún, with half a dozen horsemen well armed, and a dozen of strong-limbed peasants, with matchlocks on their shoulders and clubs in their hands, were ready to attend me to the valley of Tengí-Sáulek. This precaution was necessary on account of the wild and ferocious habits of the Behmei, an outlawed tribe who rove about in this mountainous tract of country, and scarcely recognise any authority whatever. They were at this time in open feud with the governor of Behbehán.

We now moved in the direction of N.W., having to our right stupendous mountains, bearing from S.E. to N.W., and another range of calcareous hills of less altitude, in a parallel line, on the left. The road soon became very rugged, and the country around us dreary, and entirely devoid of vegetation. We crossed the dry beds of several mountain streams, and arrived at the entrance of Tengí-Sáulek at noon, after a tedious march of 3 hours. Here we halted, sent out a party to examine whether the coast were clear, and placed videttes to give warning in case of a surprise.

Having ascertained that all was right, we entered the narrow defile, hemmed in between lofty rocks, which overhang the way. A mountain stream flowed below. As we toiled on by a steep ascent, among loose stones, we came at times upon an old pavement, the polished stones of which were so slippery that the horses could with difficulty advance. The path soon widened, and we found ourselves in a grove of oaks, cypresses, and a tree peculiar to the southern parts of Persia, called the kúh-nár, bearing a fruit somewhat similar to that of our mountain-ash, but which, when ripe, is of a yellow colour, and has a pleasant acid taste. It was in this retired glade that I found the object of my research. A huge black rock with yellow streaks, 30 or 35 feet in height, and 80 or 90 in circumference, stands detached from the rest. There are bas-reliefs and inscriptions on two of its sides. The first presents an altar, surmounted by a conical pile somewhat in the shape of a sugar-loaf, round which a ribbon is tied in a knot, with two ends streaming downwards. I learn that similar altars exist up to this day at Yezd, among the Gebrs. Close to this altar stands the móbid, or high-priest. A conical cap is placed on a very bushy head of frizzled hair, and a short beard, with a pair of mustaches, cover the lower part of the face. The right arm, clothed in a narrow striped sleeve, is extended towards the altar, while the left, partly effaced, is stuck in his bosom. The figure is clad in a short garment which descends to the knees; the lower part has a striped under-gown, and wide trousers or shálwárs, used by the Persians at the present day. A loose tunic,



thrown over the right shoulder, likewise descends to the knees. I have dwelt more minutely on this figure because it is the only one of the whole group which is in a tolerable state of preservation. On the right side of the *móbid* is a group of nine figures, but so dilapidated that one can make but little out of them. The four figures below this group, with two smaller ones, are still less distinguishable; and another figure under them, close to the ground, is not much better. On the extreme right is a figure on horseback, with a bow and arrow, in the attitude of attacking a wild animal, which stands on its hind-legs.\* It is difficult to decide whether it be a lion, a bear, or a boar. Close to the latter is a rude inscription, on the stone, of five lines, partly obliterated, and in characters unknown to me. A similar inscription, containing likewise five lines, is carved under the altar, the two last lines of which are very much effaced.

On the second face of the rock are four persons in a row. The principal figure is reclining on a couch, with its left arm on a cushion, and holding in its right hand a ring; the head is ornamented by two clusters of thick hair, but not one feature of the face can be distinguished. Two figures are seated at the foot of the couch, each with an arrow-headed spear in its right hand, and one of them has a sort of diadem on its head. Behind the couch stands a figure on tiptoe, so much damaged that it was with difficulty I could trace the outline. Below this group are some faint traces of three other figures in a frame scooped out in the rock. To the left of the two armed figures above noticed I found a third inscription, consisting likewise of five lines. These three inscriptions were published in the '*Journal Asiatique*,' for the month of April, 1842, by M. Eugène Boré, to whom I had communicated them.

Opposite to the monolith just described is another stone, somewhat smaller, about twenty or thirty paces distant from the first, and partly shaded by trees; it has no inscription, but the sculptures on it are in better preservation: they represent a figure on horseback in full career, and carrying a spear in a horizontal position. The figure is seated sideways, with its legs hanging down the right side of the horse; and, to judge by the slender form of the upper part of the body and the curve discernible over the breasts, I should pronounce it to be intended for a female. The features of the face are completely obliterated: the head is furnished with a good crop of hair. The front part of the horse is greatly damaged, but the hind-quarters are in better condition, and ornamented with drapery. Three dwarfish figures are seen behind the rider, who is rather above the ordinary size; the one

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\* Rustam, and the Div Sefid †

nearest is in the attitude of levelling a stone, which he holds over his head, at the figure on horseback; the second is unstringing a bow; and the third lies prostrate under his feet, with his head and arms downwards, and the hair in a disordered state. I must not omit to draw the attention to the hammer under the feet of the foremost dwarf, it being one of the attributes, together with the dwarfish figures that are met with, if I am not mistaken, among the Babylonian antiquities. But, be this as it may, I shall not enter here into any dissertation respecting the sculptured remains before us, because I do not feel myself adequate to the task. I shall merely observe that the style of these bas-reliefs appears to me different from all that I have seen at Persepolis, Nakshi-Rustam, Nakshi-Rejeb, Bisitûn, Takhti-Bóstán, Shâh-pûr, and Nakshi-Behrâm, in the country of the Mânâsenî. The character of the inscriptions likewise differs from the Babylonian arrow-headed and the Pehlevi letters. I have only to add, what I learned from my guides, that there exists a communication between this spot and Isfahan; and, though the road be very steep and rugged, still, to judge by the slippery worn-out pavement, above alluded to, it formerly must have been much frequented.

On our way back I found some more old sculptures on a stone close to the road, but, owing to long exposure to the air and rain, the figures were nearly all effaced; the stone being, like the two former, of a calcareous substance, and very susceptible to atmospheric influence. So that, at Tengi-Sáulek, it is the hand of Nature that has been busy in effacing the work of man, and not the mischievous chisel of the fanatic Arab, elsewhere so active in destroying the ancient monuments of the land of Irân.

The night had nearly closed in when we emerged from the defiles of Tengi-Sáulek, and I urged on my retinue in order to reach betimes the Imâm-zâdeh of Bárá-Ahmed,  $1\frac{1}{2}$  farsang (6 miles) distant, where I intended to halt: but, as the road lay through an uneven country, and part of my attendants were on foot, we made little way, and I was forced to halt at the foot of the mountains of Nauzer, somewhat more than a farsang ( $3\frac{1}{2}$  miles) to the W.S.W. of Tengi-Sáulek, and pass the night in the open air. The active mountaineers soon collected fuel from the kuh nár and other thorny trees, which grow on the skirts of the mountain, and piling the branches into large heaps, set fire to them. This pile was to serve the double purpose of cooking our suppers and searing beasts of prey, and the no less wild Behmeî. During the night we had a pleasant shower to refresh our sleep.

30th.—Before sunrise I was once more on horseback, and, dismissing my foot-attendants, who returned to Tâshûn, took with me only those who were mounted. We arrived at Bárá-Ahmed after an hour's ride (from 4 to 5 miles). At first we skirted the



mountain of Nauzer, and proceeded, after having rounded it, over uneven ground, much resembling that which we had passed over the previous day, consisting chiefly of gypsum hillocks, entirely destitute of habitations, but offering here and there patches of green turf and brushwood, especially along the valley of a mountain stream which we crossed. In this desolate region, where there is little to relieve the eye, Bába-Ahmed may be reckoned a very picturesque place. The white conical cupola of the Imám-zádeh, wrought *en relief*, peeping through a cluster of palm-trees, gives to the shrine the appearance of an immense pineapple. Bába-Ahmed has some clear springs, and is surrounded by high reeds and grass. The spot is held in great veneration among the Lur tribes.

After we had knocked for some time at the gate it was at last opened by an old dervish, from whom we learned that he is obliged to shut himself up closely every night, for fear of the intrusion of a lion which haunts the spot, and disturbs his slumbers with its roaring. This story may have been an invention to scare away other intruders; but, be this as it may, my guides were very glad we had not reached the Imám-zádeh on the previous night, because if the lion did really lurk in the neighbourhood it would certainly have made free with one of their horses, which they would have turned out to graze during the night. Lions are seldom known to attack men here; they generally fall on cattle.

The old dervish had a female companion, much about his own age of fourscore and ten, to solace his weary hours. Notwithstanding her blindness, the poor woman showed us the way to the shrine of the saint; but as I happened to be the foremost of the party, she hesitated to open the door—perhaps she scrupled to usher an infidel into the presence of the holy inmate of the cell. I therefore cut the Gorgian knot myself and entered the shrine, followed by the rest. In the middle of a dark, vaulted apartment, feebly lit by a few lamps, stands a four-cornered sarcophagus, covered over with a patched chintz stuff. On the lid are several tin lamps, brought there as offerings. The whole is in a most wretched condition. While my zealous Muselmáns went barefoot round the coffin, kissing the four sides of the wooden chest, and muttering low invocations, the old woman knelt and loudly prayed for the success of all our enterprises. A few silver coins showed her that her meaning was understood.

Bába-Ahmed is nearly W. of the entrance of Tengi-Sáulek at the distance of  $1\frac{1}{2}$  farsang ( $5\frac{1}{2}$  miles). The road here winds over a hilly country in a N.W. direction. We soon (7 o'clock A.M.) crossed the river Mogher, coming from Tengi-Mogher, and soon after another river; both are greatly choked up with rushes,



in which, my guide informed me, lions generally hide themselves during the day.

At three-quarters past 7 crossed another mountain-stream. At 9 an ascent and then a steep descent—the country much broken into hill and dale. At quarter past 9 the village of Bû-l-feriz, discernible in the direction N. by N.N.E.\* At half-past 9 crossed the river of Bû-l-feriz. At a quarter past 10 A.M. turned to N.N.W. by N.W., and passed by the remains of some stone walls. At three-quarters past 10 crossed two rivulets; the second was a stream of some size, but both were overgrown with high reeds (*kâmîsh*). At 11 A.M. ascended a hill and went along a high table-land with traces of cultivated ground and former habitations. It had been inhabited by the Bû-l-ferizi, who, not able to resist the encroachments of the Behmei, had deserted the spot and removed nearer to Behbehân.

The meadows are covered with narcissuses and another bulbous plant, with a root as thick as a strong muscular fist, and called by the natives *piyâz* (onion) 'unsul, or *piyâzi gûristân*, because it sometimes grows among tombs.† This plant is known to the Persian doctors, and used, if I recollect right, in stomach complaints.‡ It is very astringent. The *hakim-bâshî* of the Shâh Mîrzâ-Bâbâ (a man esteemed and honoured by all who know him) begged me, before I set out on my journey, to procure him, if possible, some bulbs of this plant, which I did, and at the same time sent a few to Mr. Fisher, the director of the botanical gardens at St. Petersburg. I have since had the pleasure of seeing one of these plants thriving under the assiduous care of that gentleman. I am told that it bears a blue and white flower.

At a quarter past 11 A.M. crossed a stream covered with reeds, the country still hilly, and the mountains of Nauzer discernible to the S.E. At noon we were toiling up a very steep and craggy ascent winding among high mountains, which commanded it on the right and left. As we ascended we espied some armed men advancing in the same direction as ourselves along the heights, apparently with the intention of barring the passage at the crest of the pass which we were approaching. Our party consisted of only six men with four muskets among us, but there was no receding and so we moved on. On reaching the summit we found the assembled mountaineers apparently inoffensive beings; they were Behmei shepherds of the Mahmedi § tribe, who had taken us for their enemies the Ahmedi, and had assembled to defend themselves and their flocks of sheep. This little incident (when

\* This and the following bearings are magnetic.

† *Gûristân*, or *Kabristân*, means a burying-ground in Persian.

‡ It is probably a squill (*scilla*).

§ For *Mohammedi*?

over) was rather a welcome episode to relieve the monotony of this day's tedious march.

At half past 12, from the summit of the mountains along which we moved, I took the direction of the villages of Paték and Dalún, lying to the N. on the plain below. Here the hills on our right slope gradually into the plain, having the Mungashí mountains behind them covered with snow. In order to elucidate the features of the country through which we have been travelling, I shall cast a retrospective glance over the road I have just passed.

From Behbehán the general direction is N.W.; from the village of Táshún a secondary range of calcareous hills runs parallel to the high chain which constitutes the south-eastern continuation of Zagros (Zeítún hills?). Both are intersected by valleys and ravines formed by the rivers and streams which flow in a south-westerly direction into the plain of Rám-Hormuz (or Rumiz, as the natives pronounce it) and the Cha'h country. The great chain bears different appellations from the defiles that divide it; thus near Táshún it is called Tengi-bend (Barrier Strait or Narrows); beyond it to the N.W., Tengi-Bejeck, where the Yúsufi live; Tengi-Sáulek with the Behmei tribe; Tengi-Mogher, and lastly, Tengi-Bú-l-feriz. This range is very steep and mostly barren, although the oak and other forest-trees at times meet the eye.

At three-quarters past 1 P.M. we came down on the plain of Paték (Sahrái-Paték), after having left behind us the encampment of the Behmei Ilíyáts under the sway of Khalíl Khan, and reached the village of new Patek, leaving the ruins of the old one behind. This village is inhabited by the Jáneki, to which tribe the present chief of the Bakhtiyári-Chehárleng belongs, by the mother's side.

At three-quarters past 2 P.M. we crossed the river of Allar, or Abi-Talh (Acacia-water), a considerable stream running from E. to W. between high banks. I met here with a poisonous shrub called *hizeli*, which I had gathered before on the banks of the Zoháb River on a former journey into Kurdistan. It is affirmed that animals die as soon as they eat of it.

The village of Dalún, with an *Imám-zádeh*, was left on the right. At three-quarters past 3 P.M. we arrived at Sarila, inhabited by the Zingeneh,\* a Kurdish tribe from Kermánsháh, and brought here by Nádir Sháh at the time when he transplanted the Bakhtiyári to the Turkomán frontier. The colony of the Zingeneh consisted originally of 2000 families, which from various causes are now reduced to 400.

31st.—Having ascertained that there were some ruins of an

\* Zingeneh (whence Zingari) is probably the same word as the Turkish Chingáneh, i. e. gipsy.

ancient town in the vicinity, I rode early, and taking my host, the kethudá\* of the village, for my guide, I hastened to the spot in the hopes of finding some old inscriptions; but I was sadly disappointed in meeting only with heaps of stones and mortar. These ruins commence a little to the N. of the village of Sarila, on the lower declivities of the mountains, and extend to the S.E. for upwards of a mile. Amidst a confused mass of stone some low vaulted apartments are still visible. Water was brought to this spot from the river Tezeng or A'laï,† by means of a drain in the rock, like the water-course on Kúh-i-Rahmet at Takht-i-Yemshid, which runs along the face of the mountain for a considerable distance. Further to the S.E. another deep channel was hewn in the solid rock for the purpose of conducting water from a spring in the hills to the ancient town of Kal'eh-Gebr,‡ the remains of which are scattered about in the plain below, about half a farsang (2 miles) to the E. of Sarila, having the village of Dahún to the S. These, as well as the ruins on the brow of the hill, consist of freestone, white cement, with here and there a broken wall and some gravestones, but I looked in vain for inscriptions. I was told by the kethudá that about 7 farsangs (25 miles) to the N. of this ruined town, there is a fort in the mountains, called Obid, to which only a footpath leads, and there, it is said, inscriptions are to be found. I must, however, warn travellers not to place too much reliance on what is told them by the natives, for I have often been led astray by their high-flown panegyrics on places which really did not merit the trouble of going out of one's way to see them. I do not throw out this observation with the intention of deterring any future traveller from following up the indications he may glean on his way: in this comparatively speaking *terra incognita*, every corner is interesting; and I only regret that time would not allow me to investigate more minutely these unexplored regions.

Two other ruined places in the mountains called Kalasir (Kal'ah Sir?) and Pútú, 4 farsangs (14 or 15 miles) to the E. are said to have been formerly under the jurisdiction of Kal'eh-Gebr.

At 7 A.M. I resumed my journey from the ruins, leaving to my left two Imám-zádeh, and reached the river of Tezeng or A'laï, which coming from the E. runs in a broad valley between two ranges of mountains. Turning to the W.S.W. it fertilises the district of Beizá on its left bank, whilst on its opposite shore is the large village of Méidovid, celebrated for its rice. The A'laï

\* In Turkey vulgarly pronounced kyahyá (generally spelt kiahá, &c.)

† Probably 'A'la عالى or "Upper" River; 'A'la is Arabic, but that language is much used on and near the Persian Gulf.

‡ Kal'ehi Gebr, i. e. Gebr's Castle.




or Tezeng, as well as the Allar or Abi-talh,\* are, to all appearances, affluents of the Kurdistán River, and join it in the plain of Rám-Hormuz. I believe them to be the two first rivers crossed by Timúr on leaving Rám-Hormuz, which are denominated by his biographer Sheref-ed-din of Yezd, Rám-Hormuz and Feï; whilst the river Kurdistán, which comes from Behbehán, bears the name of Aberghún.

The districts of Paték and Beízá, through which the Allar and Tezeng flow, are reckoned very productive and consist of fields of wheat and barley. The distance from yesterday's descent into the plain as far as the village of Méidooid may be about 4 farsangs (14 or 15 miles), and the breadth of the plain from  $1\frac{1}{2}$  to 2 farsangs ( $3\frac{1}{2}$  to  $7\frac{1}{2}$  miles).

At half past 7 A.M. I waded through the clear waters of the Tezeng, a broad and noble stream with a hard gravelly bottom. A fortified Jáneki village stands on its right bank, and another, surrounded by gardens, on its left. We now ascended a steep hill by a circuitous path, and entered a hilly country. The road first led to the N., then turned to the E., the general bearing being by compass N.E.

At 9 A.M. we came to an arched gateway, called Ráhdár-Dervázehi-gech. It is an old building with three round arches, in the Sásánian style; the road passes through the central gate: at the sides are vaulted apartments, probably dwelling-places for the toll-collectors, as the meaning of Ráhdár-Dervázeh (toll-gate) implies. The whole range of low hills which extends from hence in a N.W. direction towards the Asmári hills receives its name from this gate, and is called Sahrá-dervázehi-gech.† The last word signifies lime, and refers probably to the calcareous nature of these hills. It would appear from this that the line of communication between Elymais and Central Persia was over these mountains; and this may have been the road along which the commerce between Arabia and the East Indies found its way in following up the course of the river Jeráhi or Kurdistán to Rám-Hormuz, from where it joins the Kúren near the town of Moħammereh.

From Ráhdár-Dervázehi-gech the fort of Mungasht lies due E. Formerly this fort was in possession of Mirzá-Kúnnó, of Behbehán; but it has been given up by him to Mohammed Taghí Khán Bakhtiyári. Behind the fort are the towering heights of Mungasht, partly covered with snow: and in the same direction somewhat to the right, Chehár Rustam and Kaléh Nullá, the residence of Mohammed 'Ali-Khán, chief of the Teyyibi tribe of

\* Abi Talh, acacia-water.  Talh is the name of *Acacia gummifera* from the

Persian Gulf to the banks of the Senegal.

† The plain of the lime-gate.

the Khógilú. Further eastward is Bors and Dinárún. On this side of Mungasht, in a recess in the mountains, is the pretty valley of Manganón, through which flows the river of Tala, which lower down joins the Abi-Zerd, near Manjaník.

On reaching, at three-quarters past 9 A.M., a more open and elevated spot, my guide, a Behmei, whom I had picked up on the road, pointed out to me the ruins of the town of Tezeng (from which the river takes its name), bearing S.E. To this spot is attached a marvellous legend about the virtue of some talisman against scorpions, and it is even now a place of pilgrimage to the shrine of Pírí Seyyid Bezád. I mention this circumstance, because Von Hammer mentions a similar legend relating to the town of Tayyib. "Elle possède," says this learned orientalist, "un talisman contre les scorpions et les serpens;" and then refers the reader for further information to the 'Notices des Manuscrits du Roi,' tom. ii. p. 444.\*

I have a notion that the town of Tayyib may be traced to this neighbourhood. We have just seen that the Teyyibi, a division of the Khógilú tribe, live in the adjacent mountains: there is therefore a coincidence in the name as well as in the tradition. There is, however, a difficulty arising out of the degrees of latitude, for though I could take no astronomical observations on the road, yet judging by the map, I must have been at the time some degrees to the S. of 33° N. assigned to Tayyib in the Jihán Numá.† There is likewise a *Teib* on the Turkish frontier, near Wasit.

My Behmei cicerone, who seemed versed in ancient lore, made me sensible that I was treading on the classic ground where Rustem of old had his mews or stables. For a proof of the assertion, there was the identical manger out of which Rashk used to eat his provender (some huge stones piled up and joined by cement); and as a further proof what an immense animal he must have been, my Behmei friend pointed very seriously to a thick stump of an old oak, some 50 yards distant, to which it appears the hind legs of Rashk had been fastened.‡ In face of such evidence how could any doubts remain? I allude to this conversation, although it may seem trivial: I mention it as serving to throw light on the state of the knowledge among these rude tribes. This Behmei, whom I have so unceremoniously introduced, was a kásid,§ or foot-messenger, sent on an errand from his fastnesses to the camp of the Bakhtiyári chief. His only provision for the

\* Von Hammer's *Memoirs on Persia*, translated by Baron de Nerciat.

† Jihán Numá, p. 283. See *Recueil de Voyages et de Mémoires par la Société de Géographie*, tom. ii. part ii. p. 333.

‡ The horses in Persia have generally their hind legs chained to the ground.

§ Vulgarly spelt "cossid" by Anglo-Indians.

journey was a bag filled with the moist flour or raw paste of the acorn, which he very obligingly offered me to taste, and was surprised at my not relishing it. In the Bakhtiýári mountains it forms the principal food of the wandering tribes.\* Their women gather the acorns as they drop ripe from the trees, and bruise them between two stones in order to extract the bitter juice, they then wash and dry the flour in the sun, and this is the whole process. They bake cakes of it or eat the paste raw, and find it very palatable and nutritious.

After a tedious march of 2½ hours over the high and uneven country of the *Sahrá-gechi-dervázeh*, we began the steep descent into the plain, having Mungasht to the E.S.E., the road before us leading due N. At 11 A.M. we crossed the river Tala, coming from the valley of Mangán on the S.S.E., and in half an hour reached the ruins of Manjaník† in Báglú Malek. The clear waters of the A'bi-Zerd (yellow water) wash the high banks on which those ruins lie scattered in great confusion and to a vast extent. Close to the ford of the river is an isolated hill crowned by an *Imám-zádeh*, and up to the top of the hill runs a wall. Here may have been a fortress in the flourishing days of Manjaník, as it commands the city, but excepting a few walls, some loose stones, and the old *Imám-zádeh* before mentioned, no other vestiges remain. Perhaps this was the hillock pointed out to Major Rawlinson as being an artificial mound, and taken by him for a monument of the Babylonian era. The ruins of the town are certainly very extensive, but do not appear to have any claim to a remoter age than that of the Sásánides. Very likely Manjaník was inhabited in the days of the Atábegs, and even later, as some houses are still in a tolerable state of preservation and inhabited by the I'liyáts of Bághi-Malek of the Lur-zingenéh tribe. These houses consist generally of one story with a vaulted roof and round arched doorways, without windows, and have rarely more than one front room and a small recess, such as one meets in Persian caravanseráís. The common materials are freestone, with a profusion of white mortar and very rough masonry.

At the distance of 1 or 1½ farsang to the W.N.W., near the hills, some other ruins are visible. They go by the name of Argaván (crimson), but I could not ascertain any particulars about them. The river A'bi-Zerd, forcing its way through stupendous rocks close to the E.‡ of Manjaník, runs in the direction

\* The Bellote, or acorn of the *Quercus ballota*, is much eaten in Spain, and that of the *Quercus agrifolia* is very palatable.—R.

† Or Mangáník, from the Greek *Mayyansén*, Mangauíkon. The Arab *j* was anciently pronounced *g*, as in gold.

‡ W. according to Map in *Geogr. Jour.*, vol. ix. p. 26.



of Argaván, where it unites with the Tala and two other streams coming from the N. and N.E., and then loses itself among the Gech mountains. Copper coins are sometimes found here among the ruins, but notwithstanding my fair promises of remuneration, if some were brought to me, I was not lucky enough to procure any.

Having satisfied my curiosity as far as time would allow, I resumed my journey, and crossing at 1 p.m. the Abi-Zerd at the base of the mount above described, I rode to a dilapidated building two stories high, close to the left bank of the tributary to the Abi-Zerd. I was pressed for time and could not take a sketch of it, and do not perfectly recollect whether the windows and doorways had a round or a pointed arch—a feature which distinguishes the Sásánian from the Arabic architecture. Bāghi-Malek is a beautiful and fertile district, and deserves the name it bears of the King's Garden. It has groves of oak, and near to the ruined structure just mentioned, a village surrounded with orchards. The fields are well cultivated: the chief produce is tobacco for the Persian Kalyán. Here too are some plants of the *piyázi-'unsul*; but on crossing the river (at half past 1 p.m.) the vegetation ceases, and dry stony soil prevails.

At 2 p.m. we ascended a hill, and in half-an-hour came down on the plain of *Kal'eh Túl*,\* which place I reached at 3 p.m. The fort stands on a hillock, and is surrounded at its base by hovels thatched with reed. All was life and animation as I passed through the narrow streets and moved slowly up the path to the fort. It was a motley scene and highly interesting to me; my appearance must have been a novel sight to these wild children of nature, who appeared all amazement at seeing a *Frengi* in a dress so different from their own. I here found an Englishman, Mr. Layard, who had adopted the costume of the country, whose acquaintance I had made before at Hamadán, and whom I had met latterly at Behbehán. I learned from him that Mohammed Taghí Khán, the chief of *Kal'eh Túl*, was encamped at *Mál-Amir*, to receive the governor of *Ispahán*, *Luristán*, and *'Arabistán*, and who was coming with an armed force to inspect the two latter provinces. We therefore agreed to set out on the following morning to the *Bakhtiyári* camp.

*February 1st.*—The distance from *Túl* to *Mál-Amir* is by estimate 4 farsangs (19 miles). The road is circuitous: a narrow and difficult pass through the mountains shortens the way by about a farsang. We moved about  $1\frac{1}{2}$  hour in the direction of N.W. across a plain, having to the right a high chain of moun-

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\* *Túl*, i. e. *Long*.

tains, and to the left a succession of lower ridges. On the road we passed close to a burying-place with a number of white tombstones. The figure of a lion rudely sculptured from the same material is placed on the tombs, and seems to be the favourite funeral ornament in this part of the country, as the black ram found in the old cemeteries near Tabriz was in that of Azerbeigán.

We next entered a defile, or narrow valley, in the hills, which brought us, after an hour's ride, to another plain called Halegún, on which are ruins belonging evidently to two widely different eras. I very much question, however, whether the town of Eidej stood here, as the extent of the more ancient ruins is not very considerable. Indeed the only really ancient relic of any consequence is a four-cornered space, surrounded by a mound or high wall of earth, and having round the inner court a succession of vaulted cells, similar to what one meets in old Persian caravanserais,\* but on a larger scale. It may, perhaps, have been a similar structure to the cells which Ibn Batútá, in his travels through the dominions of the Atábegs of Luri-Buzurg, says he found at each station of the road.†

I likewise searched here for some traces of the celebrated bridge of Hárabzád, or Járzád, supposed to have been erected by the mother of Ardashír, but without success.‡

The ruins of the second class are quite modern. They were inhabited by Hasan-Khan, former chief of the Bakhúyári-Chehárleng, who resided here some twenty years ago (in 1821), before he was treacherously put to death by his kinsman Mohammed Taghí Khán, to whose camp I was now proceeding. Close to the ruined residence of the murdered chief is the village of Halegún, inhabited by the Jánekí tribe.

We forded the river of Halegún, otherwise called Sháh-ruben, an insignificant stream at this season of the year, and turning to the E. entered on the great plain of Mál-Amír, and reached the tents of the mountaineers. The plain of Mál-Amír (Commander's wealth) is above 2 farsangs (7 miles) in length from S. to N., and in some parts nearly 2 farsangs in breadth. It is surrounded by hills, the highest chain of which lies to the N.E., and extends southward to the Mungasht hills. Mál-Amír has fine green meadows, and is watered by several mountain-streams; it has also two lakes called Shatt-bends (Shore-dykes), one on the N.W. and the other on the E. side of the plain; but I was told that they

\* As, for example, at Deír (convent), in the desert between Verámin and Kúm, on the ancient line of communication between Isfahán and the Caspian provinces.

† See *Travels of Ibn Batútá*, chap. vii., transl. by Lee.

‡ It will be seen in the sequel that, on returning to this spot, I did find the buttress of a bridge on the left bank of the river, which runs close to the walls of Halegún.

are sometimes dried up. Zakhariyá Kazviní speaks of a lake in these parts, which he calls 'Amin-al-bawwáb.\* On this plain are several artificial mounds of different sizes, one of which may be compared in height with the grand mound at Shúsh, near Dízful. It lies  $\frac{3}{4}$  of a farsang to the E. of some natural caves in the hills, where I found very curious remains of antiquity. The lesser cave to the right has some huge stones cemented together, which may have served for the base to an altar—I shall presently explain the reason which makes me think so. In the more spacious cavern on the left of this one, are two colossal figures † sculptured on the wall, but almost entirely obliterated by the water oozing through the crevices of the rock by the consequent dampness of the cave. An immense inscription, which takes up nearly the whole space between the figures, has suffered equally from the same causes. One of the figures is represented in profile, and looks towards the smaller cave, where I presume the altar must have stood, with his hands clasped, and in what seems to be an attitude of adoration. The outlines of the figure are in good proportion, and I thought I could discern some arrow-headed characters on his short garment. The figure to the left is less graceful, and has its face turned full to the beholder. It has fronting you a long beard ending in two curls, and a lock of hair falling down the shoulders, somewhat in the Hebrew fashion. The inscription I have just alluded to consists of 33 lines, ‡ from 8 to 10 feet in length. It is in arrow-headed characters, but so much injured by the oozing of water through the rock and along the side of the wall, that, though I scrambled up to have a nearer view of it, I was obliged to relinquish the idea of making a copy.

On the opposite side, or to the right of the smaller cave, are two more bas-reliefs on the external face of the rock, and these are in a much better state of preservation than the former, owing to the stone on which they are sculptured being harder. The foremost consists of the figures of a man and woman, with a child between them. Their arms are folded, and their faces, but not their whole bodies, turned in profile towards the altar. The man is broad-shouldered, and has a beard; he has an angular cap on, and is dressed in a tunic, which does not reach below the knee, with short sleeves, like the felt coats which are worn at this day by the Iliyáts. The head of the female figure is carefully and tastefully worked out; the features are delicate and regular, and the head-dress somewhat resembles the chaste style of the Grecian statues.

\* Uyenbroke, *Inaca Persica*, pp. 25, 31.

† See plate Litt. E.

‡ The slab with a cuneiform inscription on the great mound at Shúsh has the same number of lines.



The next bas-relief has in front the figures of two adult males and two children, and in the rear the figure of a female. They are all turned the same way, pointing, apparently, with their fingers towards the altar. The foremost is dressed nearly in the same fashion as the male figure in the previous group; the second has a round cap, such as is worn at the present day by some of the Bakhtiyári, and made of felt. The head-dress of the female resembles the high turban of the Jewish women. This spot bears the name of Shikoftehi-Suleimán,\* according to the Mussulmáns, from a third cave in which are interred the mortal remains of Suleimán, the tutor and friend of Heszreti Ali. In the arena before the caves, and on the slope which extends down into the plain, there are numerous remains of habitations. The houses must have been crowded one above the other; and I had observed a similar appearance at K'aleh-Gebr.† They are probably of the Sásánian era. I do not remember to have seen any bricks; all the buildings are of freestone, cemented with a very hard whitish plaster. On the plain, fragments of this stone and mortar lie scattered about to a vast extent; and here Eidej, perhaps, once stood.

Four farsangs (15 miles) to the N. of Mál-Amír, beyond the high range of mountains, is Shúshan, on the river Kuren, in the district of Dínárún; but as time did not allow me to visit that interesting spot, and as Mr. Layard has given a description of it,‡ I shall not dwell on this subject. I have only to observe that on my return to Tehrán I was informed by a Bakhtiyári chief of the Heftleng tribe, of the existence of a cavern in the rock 1 day's march (W.) from Shúshan and 2 from Shúshter. At the entrance of this cave or labyrinth are some sculptured figures to the right and left of a long inscription, which, according to the description of my informant, must be in the arrow-headed character.

As the causeways, generally known by the name of Jáddehi Atábeg, or the high road of the Atábegs, is in the vicinity of Mál-Amír, and has been in part visited by me, I may venture here to offer some remarks on it.

The great line of communication which existed from the re-

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\* Quere, Shikáf, "the cave of" ?

† In spring and during the rainy season, a beautiful cascade rushes down from the top of the hill between the two bas-reliefs, and must present a splendid spectacle. Similar cascades are to be seen in the Elburz chain. There is one at Pás-K'aleh, in the Shemíram mountains, not far from Tehrán, which the late Fet'h-'All-Sháh used to visit in summer to enjoy the coolness as well as the beauty of the spot. Another waterfall occurs between the mountain villages of Kend and Soleygán, 4 farsangs (15 miles) from Tehrán. There is likewise a splendid cascade on the road to Mazanderán, after descending the Gadúk pass; and one or two more on the way from Isfahán to the districts of Chebár Moghal and Feridún, near the Bakhtiyári mountains.

‡ See "Journal of the Royal Geographical Society of London," vol. xii., for the year 1842.

most ages between Susiana and Central Persia, lay across a chain of mountains, which are a continuation of the Zagros, but as the road presented many difficulties on account of the ruggedness of the country, it is natural to suppose that this circumstance must have early attracted the attention of the rulers of Elymaïs, and suggested the idea of rendering it more practicable; we consequently find that the steepest ascents and descents of the mountains are paved with huge blocks of hewn stone. The pavement may be from 8 to 9 feet in breadth; and between every fifteen or twenty blocks, broad slabs of stone are laid across the way to keep the intermediate masonry firm. These are, as it were, the ligatures of the causeway. Although this pavement is now in some places much dilapidated, it is on the whole in better preservation than the much more modern causeway of 'Abbás the Great, in Mázanderán. This can be easily accounted for. The pavement of 'Abbás has given way more rapidly on account of the more yielding soil on which it was erected, and the greater moisture of the atmosphere near the Caspian. The colossal character of the causeway named Jáddehi Atábeg induces me to refer its construction to a remote period. The Atábegs of Luri-Buzurg, we learn from Ibn Batútá,\* were only petty rulers in this district under the Sultáns of Irák, and therefore not likely to have been the authors of so vast an undertaking. Possibly they may have repaired the road, having to use it whenever they went to pay their court to their liege lord at Isfahán,† hence it may have been called the road of the Atábegs. In a more detailed account of my travels through this part of Persia, I shall point out the great resemblance the Jáddehi Atábeg bears to the *ladder-road* described by Diodorus Siculus. Having little time to spare, I resolved, instead of visiting Shúshter, to return to Isfahán by the Jáddehi Atábeg, but after the first day's march I learned that the passage was closed for the season, by heavy falls of snow in the mountains, and all communication precluded till the return of spring; I had therefore to retrace my steps and take the circuitous road over 'Arabistán and Luristán, in order to return to Tehrán. I obtained from a Bakhtiyári chief the following list of stations on the Jáddehi Atábeg, between Mál-Amír and Isfahán. The road was found practicable by the governor of Isfahán, who brought with him across the mountains two field-pieces, six-pounders.

From Mál-Amír to Chebár-Deb, or Kal'eh-medreseh.

"	"	Dehi-diz.
"	"	Revár.
"	"	Helusad.

\* See chap. vii., translated by Professor Leef.

† Ibn Batútá, chap. vii. in Lee's translation.

From Mál-Amír to Armen.

- |   |   |   |
|---|---|---|
| " | " | Lardegún.   |
| " | " | Felád (probably Pellaut in Mr. Arrow-smith's map).                  |
| " | " | Semíran.  |
| " | " | Kárí, or to Kumishéb, and from thence by the usual road to Isfahán. |

I shall now shortly state the direction I took across the mountains from Mál-Amír to Shúshter, where I arrived on the fourth day. The distance in a direct line (due W.) is not, I presume, more than 16 farsangs (60 miles); the windings of the road will add 4 or 5 farsangs (19 miles) more.

Two roads lead from Mál-Amír to Shúshter: the first over Kal'eh-Túl, Tauleh, and Gúgird;\* the second straight across the mountains, joining the former road near Kháři-Shutur-Zár. I chose the latter, because it enabled me to gain a day, and at the same time to explore an unknown part of the country. The other road had already been described by Major Rawlinson.

7th.—I left the camp of the governor of Isfahán and of the Bakhtiyári chief, at a quarter past 12, and proceeded by the plain of Mál-Amír in a southern direction for three-quarters of an hour; and then turning to W.S.W. by W., proceeded in that direction three-quarters of an hour more; at the end of this time reached the river of Sháh-ruben, which I had crossed before on my way from Kal'eh-Túl. I here discovered on the left bank some brick masonry, probably the buttresses of a bridge. The insignificant appearance of the stream made me doubt at first whether so stupendous a bridge as Zakhariyá-Kazvini describes that of Jarzád, or Hárakhzád, could have been necessary; but this author's observation that the river swells to a great extent during the rainy season and when the snow melts in the mountains (a fact which was corroborated to me by the natives), reconciled me to the idea that the bridge of Jarzád might have stood here. This supposition acquires a still greater degree of probability when we consider that the great caravan-road between Susiana and Media must have passed this way. Close to the remains are the ruins of Halegún.

Here the road turns first to W.N.W. and then to the W., whilst the river flows in a N.W. direction towards Pír-i-Sháh-ruben-mal-Seyīdi, a place of pilgrimage for the Mussulmáns, reported to contain some ancient ruins. I was also assured that at Nútérgí, somewhat to the right of the former place, there are the remains of an ancient town. I believe that by following the course of the river Sháh-ruben to its confluence with the Kuren, the inquisitive

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\* Gulgir in Mr. Rawlinson's notes.



traveller would find objects to repay the investigation; because the valley in which it flows appears green and fertile as far as the eye can reach, and must have been at all times the favourite resort, from the contrast it affords to the barren rocks that surround it.

To the left of Nútergi is the village of Ablah. Close to the road we passed by a square building called Kuruk, and a burying-place full of white lions, which serve as tombstones.

After traversing a hilly country and crossing the river of Duruv, also a tributary of the Kuren, we struck to the S.W., and alighted for the night at a Bakhtiyári encampment of the Tembi tribe, having travelled 3 or 3½ farsangs (11 miles).

*8th.*—We started at a quarter past 6 A.M. The road led W., over very steep hills, partly barren, partly covered with oaks and the kúh-nár. An hour brought us to a precipitous descent into the valley of Murdesil, in which some patches of ground are cultivated by the Jáneki of the Arab-Gomish tribe; the rest is all a slaty rock, the country wild and mountainous. At 9 we reached another valley, with some springs of fresh-water and a mineral spring. Several fragments of stone and mortar were scattered here and there; and some gravestones denoted that this place had once been inhabited. We crossed the Duruv (likewise called Murdesil) several times: its water is brackish. Near at hand, on the left, were the lofty and precipitous heights of the Asmári hills, formed principally of black slate. Two hours more brought us to the north-western extremity of this chain, at the foot of which is a sulphurous spring. Having no thermometer with me, I could not ascertain its degree of heat; but I found the water pleasantly warm for bathing. The opposite, south-eastern, extremity of Kúhi-Asmári I had seen from Manjanik; so that the whole extent of it, from S.E. to N.W., may be estimated at from 5 to 6 farsangs (22½ miles). It is distinguishable from the surrounding mountains by its height and black colour, being almost entirely of slate, while the other hills are calcareous. A plain, bounded at its northern extremity by a snowy range of mountains, lay on our right. On turning the angle of Kúhi-Asmári we entered on the plain of Gúgird, and, advancing in a S.W. direction, soon arrived at some ruined buildings, of freestone, with vaulted rooms; probably of the Sasánian era. To the S. of this spot, at the distance of a farsang, I descried another building in the plain, and was told, by some Bakhtiyári guides whom I had picked up on the road, that I should find there the ruins of an ancient temple, with white marble columns, together with inscriptions and carvings on stone. With the cheering prospect of such a rich antiquarian harvest before me, I did not mind making a great detour; though my new acquaintances would not consent to ac-

company me. My illusory anticipations were soon dissipated on a nearer inspection: I found only a deserted Imám-zâdeh, some gravestones, with some Persic and Arabic inscriptions, and a considerable space of ground strewed over with stone and mortar; the relics of some small town or extensive village, which, together with its former inhabitants, was now crumbling into dust. The soil of the plain of Gúgird is clayey, and produces wheat, which is sown in December, and reaped in March, before the vernal equinox. When the rains are abundant, the harvest yields from 10 to 15 grains for 1.

The road leading from Tauleh joins that along which we were travelling at the foot of some gypsum hills at the extremity of the plain, which is about 2 farsangs (7 miles) in breadth. These hills are not steep, and are the continuation of the Kúhi-Gech, which I had crossed on the other side of Manjaník. Their direction is from S.E. to N.W., parallel to the Asmári ridge. We cleared these hills in three-quarters of an hour; forded a mountain stream full of reeds, and flowing from N. to S. I took up my quarters for the night at the hospitable tent of an old Jáneki, who was encamped with his tribe in the plain of Khári-Shutur-Zár.

I learned from my host that the Jáneki are divided into the following tribes:—the Gúgirdí, at Khári-Shutur-Zár and Gúgird; the Makavendí, at Járú, near Tauleh; the 'Arab-Gomish, between Mál-Amír and Gúgird; the Mumbení, near the snowy range to the N.; and the Bulveís, near Kal'eh Túl.

Tauleh lies 6 farsangs (22 miles) S.E. from Khári-Shutur-Zár; and the river Kuren a day's journey to the N.

9th.—We proceeded to Beitávend, 7 farsangs (26 miles), at first due W., and then N.W. The snowy summits of Mungasht receded to the S.E. An hour's journey brought us to the boundary of the Jáneki country and Shúshter. To the right of the line of road was the chain of Kúhi-Gech, and to the left Kúhi-Siyáh. Behind the latter range dwell the Arabs of the Mesi-Bení tribe. The Günduzlú,\* an Afshár tribe, also cross to that side in winter, and approach the valley of the Kuren in summer. After 3 hours' march from Khári-Shutur-Zár, we left on our right a road which leads also E., across Kúhi-Gech to Gúgird; and passing the cultivated ground of Sheker-áb (sugar-water), we forded the river Shúrish-áb several times. The country is undulating. We next passed along an elevated ground covered with kúh-nár, and passed a *tepeh*,† or mound, surrounded with some old tomb-

\* كوندزي (Daylight People), a Turkish name.

† *Tepeh*, spelt and pronounced "tappah" by Major Rawlinson, is the Turkish word for hillock or tumulus.—R.

stones. This district, as well as Sheker-áb, belongs to the Gánduzlú tribe.

At Beitávend, which we reached after a march of 7 hours, we found the village deserted, the inhabitants having fled into the mountains as soon as they learned that the governor of Isfahán was to pass with his troops in that direction on his way to Shúshter and Dizfúl. Beitávend is situated at the foot of the gypsum hills, and surrounded by green fields and meadows, through which runs a rivulet coming from the mountains to the right, which I had crossed in approaching the place: the water is brackish. The village consists of about 100 neat and clean houses, with an imam-zadeh on the top of a hillock. I learned, from an old dervish, that the Mesh-hedi Suleimán Kuchúk (*i. e.* place of martyrdom of Solomon the Little), mentioned by Major Rawlinson, is 4 farsangs (15 miles) distant from Beitávend, on the right of the road leading to Shúshter; and that it has some white columns and slabs of stone: but I could not command sufficient time to verify the fact.

10th.—From Beitávend to Shúshter is called a distance of 4 farsangs (15 miles). We started at half-past 4 A.M. For the first hour we travelled S.W. by W., through cultivated fields. After crossing the river Shúrish-áb, we turned, at half-past 5 A.M., to the W., and went over broken hills of sandstone. At half-past 6 A.M. the bearing of the road was W.N.W.; it retained this direction, with trifling variations, till we reached Shúshter. We passed on the way many ruined villages and old *bends* or dykes, which formerly had served to form reservoirs, as fresh water is scarce here. The country, as we approached Shúshter, becomes more level and better cultivated. We are in the district of Pírchistán, or Pishistán. At half-past 8 A.M. the plain of 'Arabistán opened to our view, and the river Kuren was seen issuing from the hills to the right, and taking a S.S.W. course towards Shúshter. The river Shúrish, flowing in a N.N.W. direction, joins it at the village of Akili, near the mountains. On approaching the town, the road passed close to the ruined mosque of Pír-i-Shemsu-d-dín, perched on the summit of a steep hill, from the top of which I had a commanding view over the whole country. The Imám-Zádeh Sáhib-Zemán was next passed, and we at length entered Shúshter, at 11 A.M., from the E., over a low stone bridge, which serves as a *bend* to distribute the waters that flow from the Kuren in this direction into various channels for the use of water-mills.



*Appendix to the two preceding papers:—On the probable Site of the Uxian city besieged by Alexander the Great on his way from Persis to Susa.*

On re-perusing Quintus Curtius's description of the march of Alexander the Great from Susa to Persepolis, I am struck with the resemblance which the description of the situation of the town of the Uxians, besieged by the Macedonian conqueror, bears to the vicinity of the caves of Šhikostehi-Suleimán, in the country of the Bakhtiýári. The country of the Uxii lay between Susiana and Persis; E. of the Pasitigris (the Kuren), and W. of the Oroatis (the Ab-Shirin).<sup>\*</sup> The southern part of this district is a flat plain, the northern a mountainous region.

The town of the Uxians was situated in a hilly country—consequently we must look for it in a northern direction. We learn from Quintus Curtius the number of days Alexander took to reach the left bank of the Pasitigris from Susa; but none of his historians mentions how many days more were requisite to reach the town of the Uxii. In the absence of such information, perhaps the safest plan is to examine whether any part of the country answers the description ancient authors give of the situation of this town, and whether any ruins exist on that spot. Both these conditions are fulfilled on the plain of Mál-Amír.

I shall, in the first place, quote the passage in Curtius, in which the situation of the town of the Uxii is indicated:—"Individuals," says Curtius, "of local knowledge apprized Alexander that there was a by-track through the defiles, leading to the back of the city, where a small light-armed detachment might climb an eminence commanding the enemy. This counsel approved, and those who had imparted it selected as guides, the king directed Tauron, with 1500 mercenaries and about a thousand Agrians, to penetrate in that direction after sunset. Alexander, on his part, broke up the camp at the third watch, and at day-break had passed the straits. Having cut materials for hurdles and rolling frames to cover those who should advance the engines, he began to besiege the town. *All around, crags, rocks, and precipices obstructed access.* . . . The soldiers, therefore, wounded in numbers, were repulsed, for they had to conflict not only with their enemy, but with the place. Again they moved up—rallied by Alexander, who stood among the foremost:—"Are you not ashamed, having conquered so many fortified cities, to waver in the siege of a small obscure castle?" The king was now attacked with missiles; he could not be induced to withdraw, and the soldiers

<sup>\*</sup> See Arrian, b. iii., c. xvii.; and Pliny, translated by Stray, tom. ii., liv. vi., ch. xxvii., p. 805.

formed a tortoise with their bucklers to protect him. At length Tauron appeared with the detachment above the fort. This display caused the enemy to droop, and the Macedonians to fight with augmented vigour. The inhabitants of the town were pressed by two divisions, of which the assault was irresistible; many were solicitous to fly, a great number escaped into the fort. Hence they sent out deputies to Alexander to implore quarter."

Further on the author adds: "Messengers were likewise sent to Sisygambis to solicit her intercession with Alexander in behalf of the inhabitants, and Alexander granted not only amnesty to Madates, but liberty and immunity both to the captives and the inhabitants surrendering: *the city he left untouched*, and the inhabitants permitted to cultivate their lands tax-free."\* Arrian's account of the siege may also be referred to with advantage. I quote from Chaussard's translation:—

"Alexandre part de Suse avec son armée, passe le Pasitigre, et entre dans le pays des Uxiens, &c. . . . Il prend avec lui ses gardes, les Hypaspistes et huit mille hommes du reste de l'armée, et se dirigeant de nuit par un *chemin détourné* ayant pour guides des Susiens, il franchit en une marche des défilés inaccessibles, pénètre dans un bourg des Uxiens, les surprend, plusieurs sont tués dans leurs lits, les autres se dispersent dans les montagnes; le vainqueur fait un butin considérable. Il marche précipitamment vers les gorges où il avait donné rendez-vous aux Uxiens

\* See Pratt's Q. Curtius. The passage here quoted occurs in the third chapter of the fifth book. The original is as follows:—"Sed periti locorum Alexandrum docent, occultum iter esse per colles, et aversum ab urbe, si paucos minime levis armatos, super capitis hostium cessuros. Cum consilium placuisset, iidem itinerum fuerunt duces, et et d'intercede conducti, et Agriani fere et Tauroni prefecto dati, ac post sola occultum iter ingredi jussi. Ipse tertia vigilia castris motis circa lucis ortum superaverat angustias, casaque materia eratibus et plenteis faciendis, ut qui turres admovebant, extra telli iectum essent, urbem obsidere cepit. Prærupta erant omnia, saxo et cotibus impedita, inultis ergo vulneribus depulsi, ut quibus non cum hoste solum, sed etiam cum loco dimicandum esset, subibant tamen: quia rex inter primos constiterat, interrogans tot urbem victores; an erubescerent hærere in obsidione castelli exigui et ignobilis? Simul jam inter hæc eminui petebatur; quum testudine objecta milites, qui ut inde discederet, percellere nequiverant, tuebantur. Tandem Tauron super arcem urbis se cum suo agmine ostendit: ad ejus conspectum et animi hostium labare; et Macedones acius prælium inire coperunt. Anceps oppidanos malum urgebat; nec sisti vis hostium poterat. Paucis ad moriendum; pluribus ad fugam animus fuit: magna pars in arcem concessit. Inde xxx oratoribus missis ad deprecandum, triste responsum a rege reddidit; non esse veniæ locum. Itaque suppliciorum metu percussus, ad Sisygambim, Darii matrem, occulto itinere, ignotoque hostibus, mittunt, qui peterent, ut ipsa regem mitigaret: haud ignari, parentis eam loco diligere colique, et Madates sororis filium secum matrimonio junxerat: Darium propinqua cognatione contingens. Diu Sisygambis supplicum precibus repugnavit, abnuens, deprecationem pro illo convenire fortune, in qua esset: aspicitque, metueret esse, ne victoris indulgentiam fatigaret, sæpius cogitare, captivum esse se, quam reginam fuisse. Ad ultimum victa, literis Alexandrum ita deprecata est: ut ipsam excusaret quod deprecaretur, potere se, ut illis quoque; si minus, sibi ignosceret, pro necessario ac propinquo suo; jam non hoste; sed supplice tantum vitam precari. Moderationem elementiamque regis, quæ tunc fuit, vel una hæc res posuit ostendere, non Madati modo ignovit; sed omnes, et deditos, et captivos libertate atque immunitate donavit: urbem reliquit intactam: agros sine tributo colere permisit."—pp. 333-7.

pour recevoir le tribut. *Cratærus*, qu'il a détaché en avant (*Curtius* mentions *Tauron*), a dû occuper les hauteurs pour fermer la retraite à l'ennemi; lui-même il double le pas, s'empare des défilés, range ses troupes, et foud sur les barbares avec tout l'avantage du lieu. Consternés de la rapidité d'*Alexandre*, privés du poste sur lequel ils comptaient, les barbares fuyent sans en venir aux mains. Une grande partie périt sous le fer des *Macédoniens* qui les poursuivaient; une autre dans les précipices; le plus grand nombre se sauvant sur les montagnes, où *Cratærus* les a devancés, y reçoivent la mort.\*

On the map which serves to illustrate my route from *Kazrûn* to *Shûslîter*, it may be observed that there is a narrow passage connecting the plains of *Halegûn* and *Mâl-Amîr*, through which the river of *Shâh-Ruben* takes its course. It is the only approach to the latter plain from the S.W., the direction from which *Alexander* marched. I think this pass represents the *straits* (τα στενά, angustie) mentioned in *Arrian* and *Quintus Curtius*, and which it was necessary for *Alexander* to secure before he could enter on the plain where the *Uxian* town stood. With the exception of this strait, *Mâl-Amîr* is encompassed by mountains; on the western face of which in a recess are the famous caves of *Shikoftehi-Suleimân*. These caverns are not at the foot but on the declivity of the hills, and the passage leading up narrows as it approaches them; or if we look from above, the ravine at the head of which the caves are situated appears to spread out like a fan till it is lost in the plain. The whole ravine is strewn over in every direction with stones, mortar, and clusters of ruined houses scattered among the rocks, crags, and projecting masses of stone. Stupendous rocks rise above the caves and this ruined town, and during the rainy season a cascade gushes down from the heights. The breadth of these hills from E. to W., or from the caves of *Shikoftehi-Suleimân* to the valley of *Shâh-Ruben*, which forms their western boundary, may be about ten miles, and it is over this tract of hilly country that *Tauron* had to march before he appeared above the heads of

\* This passage occurs in the 17th chapter of the 3rd book of *Arrian's* *Ἀναβάσις*. The original is as follows:—“Ἄρας δὲ ἐκ Σούσων, καὶ διαβὰς τὸν Πασιτίγην ποταμὸν ἐμβάλλει εἰς τὴν Οὐξίαν γῆν. . . . . Αὐτὸς δὲ ἀναλαβὼν τοὺς σωματοφύλακας τοῦ βασιλικοῦ, καὶ τοὺς ὑπασπιστάς, καὶ τῆς ἑλληνὸς στρατίης ἐς ὀκτακισχιλίους, τῇ νυκτὶ φεῖ ἄλλην ἢ τὴν φασερὰν, ἡγρῶσμενυν αὐτῷ τῶν Σουσίων καὶ διελθὼν ὄδον τραχιῶσαν καὶ δύστροπον ἐν μῆσιν ἡμέρῃ, ἐμπίπτει ταῖς κόμμασι τῶν Οὐξίων, καὶ λείαν τε πολλὴν λαβὰς, καὶ αὐτῶν ἔτι ἐν ταῖς θύραις ὄντων πολλοὺς κατέκτεινεν· οἱ δὲ ἀπέφυγον εἰς τὰ ὄρη· αὐτὸς δὲ φεῖ σπουδῇ ἐπὶ τὰ στενά, ἵνα ἀπαυθίσσῃ οἱ Οὐξιοὶ πανδημεὶ ἰδόντων, ληφόμενοι τὰ τεταγμένα. Κρατερὸν δὲ ἔτι πρόσθεν ἀπέστειλε, τὰ ἄκρα καταλαμβάνοντα, ἵνα φέτο βιαζομένων τοὺς Οὐξίους ἀποχωρήσειν· αὐτὸς δὲ πολλὰ τάχει φεῖ· καὶ φθάσει τε κρατῆρας τῶν παρόντων, καὶ συντεταγμένους τοὺς ἀπ’ αὐτῶν ἔχων ἐξ ὑπερβείων χωρίων ἐπὶ ἡν ὡς ἐπὶ τοὺς βαρβάρους. Οἱ δὲ τῇ τε τάχει τῇ Ἀλεξάνδρου ἐκπληγόντες, καὶ τοὺς χωρίους, οἱ μάλιστα δὴ ἐπεποιθόσας, πλεονεκτούμενοι ἔφυγον, οὐδὲ εἰς χεῖρας ἑλθόντες· καὶ αἱ μὲν αὐτῶν ὑπὸ τῶν περὶ Ἀλεξάνδρον ἐν τῇ φεγγὶ ἀνέθανον πολλοὶ δὲ καὶ κατὰ τὴν ὁδὸν, κρημνώδῃ οὖσαν· οἱ πλεῖστοι δὲ ἐπὶ τὰ ὄρη ἀναφύγοντες ἐμπίπτουσιν ἐς τοὺς ἀπ’ Κρατερῶν, καὶ ἐπὶ τούτων ἀπώλυντο.



the amazed inhabitants of the besieged town, who little expected to be attacked from that quarter.

Curtius, in stating further that a great number of the inhabitants escaped into *the fort*, proves that the town besieged at the hill was not the only fortified place in the neighbourhood.\* The expression likewise that *Alexander left the city untouched*, I think, cannot be applied to that which he had just captured—putting the inhabitants to flight, and to the sword. It was also from this fort that a deputation was sent to Alexander to implore quarter; and that messengers were dispatched to Sisymbria, beseeching her to intercede in favour of the inhabitants. Now we learn from Diodorus that this princess was left at Susa with the other female members of Darius's family;† so that the messengers had to travel there and back; and, allowing the utmost expedition, an answer could hardly have been received before the expiration of three or four days, the distance in a straight line being not less than 100 miles. What was Alexander about in the meanwhile? He was most probably recruiting his troops after the hot reception they had met from the Uxians, and preparing to lay siege to the fort, which must have been of some strength to require such preparation.

Now, in the middle of the plain, about 3 miles to the E. of the caves, rises an immense artificial mound, the dimensions of which are certainly not less imposing than those at Shus and Babylon. It is surrounded by broken and uneven ground; but a luxuriant carpet of green grass conceals its structure from the inquisitive eye. It affords, however, a strong argument in favour of the existence here in former times of a considerable fort; and corroborates my impression that Mál-Amir is the site of the Uxian town besieged by Alexander.

With regard to what Arrian says of Alexander's destroying the small villages and dispersing the inhabitants before he entered the strait, may relate to the plain of Halegún. I found some ruins not far distant from the pass which leads to Mál-Amir, which I at first was inclined to attribute to the Sasanian, or even a later period. Little stress can, however, be laid upon this circumstance, for the same stones may have been used by the Elamites, the Uxians, the Sasanians, the Arabs, and the Atabegs of Lur, as they succeeded each other. It serves only to show that these straits were formerly guarded, and explains the apparent neglect of Madates to secure them otherwise than by entrusting them to the inhabitants of the villages.

How far the facts here noticed may satisfy others as to the identity of the ruins in Mál-Amir with the Uxian city alluded to

\* To us the expression of the historian appears merely to imply that they took refuge in the citadel or acropolis, which seems not likely to be 3 miles distant (see sequel) from the town. But we have not presumed to change the text.—Ed.

† See Diodore de Sicile, translated by Miot.

in the narratives of Alexander's expeditions I do not know, but on my mind they have left not the shadow of a doubt.

If the position of the town of the Uxii can be considered as established, it will serve as a collateral proof that the Pasitigris is no other than the Abi-Kuren, for this river never could be to the E. of this place; and the historians of Alexander do not mention his having passed any other considerable stream in his advance from the time he had crossed the Pasitigris on entering the territories of the Uxii. As there are remains of other ancient towns in the country of the Bakhüyári, besides the ruins found at Mál-Amír, I have examined whether any of them could serve as a representative for the city of the Uxii. This examination has only tended to confirm me in my former opinion, that it can be represented by no other ruins than those close to the caves of Shikoftehi-Suleimán. The places I allude to are—Shushan, Manjanik, Kal'eh-Gebr, and Tashún. Shushan, although in the vicinity of the caves just adverted to, cannot have been the Uxian town in question, because, as it lies on the right bank of the Kuren in the mountains 4 farsangs to the N. of Mál-Amír, Alexander would have had to cross that river, or, in other words, to re-cross the upper course of the Pasitigris before he could reach that town, a circumstance of which his historians make no mention. Neither can Manjanik be regarded as the town of the Uxii, for it does not stand at the feet of any considerable hills; and, according to Arrian and Quintus Curtius, the city was overhung by precipices, from the top of which Tauron attacked the inhabitants, while Alexander pressed from below. The ruins of Kal'eh-Gebr, near the river Tezeng, are scattered partly on the plain, partly on a rising ground backed by a chain of mountains; but these mountains are so high and steep, that although means may perhaps exist to attain their summit from behind, the inhabitants of the besieged city could in no way have scaled them in front while trying to escape from Alexander. Moreover, the rising ground or bank which runs along the foot of the hills, and on which the ruins are scattered, could have presented no material obstacle to the advance of Alexander's soldiers.

I need scarcely allude to the town of Tashún, for, independently of its topographical situation not answering Curtius's description of the Uxian city, it may be seen, by reference to the map, that it is not far distant from the river Tab, which formed the boundary line between Susiana and Persis, at the prolongation of the Zagros chain—whilst we read in Curtius that Alexander, after leaving the Uxian town, required three marches to arrive at the frontiers of the latter province. My reasons for considering the Tab or Kurdistan river the ancient limit between Susiana and Persis must be reserved for another paper.







IV.—*Some Account of the Natron Lakes of Egypt; in a Letter to W. R. Hamilton, Esq. From Sir GARDNER WILKINSON.*

*On the Nile, Jan. 18th, 1842.*

As I have lately had an opportunity of examining a part of Egypt which has, I believe, hitherto been imperfectly laid down in the maps of that country, I beg you to do me the favour to lay before the Geographical Society the following observations on the Natron Lakes and the Bahr-el-Fargh, with the accompanying survey of that district :—

The usual route from the Nile to the Natron Lakes or Wady Natrún is from Teráneh, and a march of 12 hours is calculated as the distance from that place to the village of Zakúk, the most northerly inhabited spot in the Natron Valley. The road, on quitting the Nile, passes at the distance of about  $1\frac{1}{2}$  mile over the ruins of an ancient town, which have of late years been turned up in every direction for the purpose of collecting the nitre that abounds in the mounds of the old towns of Egypt. These ruins are of great extent, and apparently, from the burnt bricks and small decomposed copper coins occasionally found amongst them, of Roman times. Some columns, one of which is about  $2\frac{1}{2}$  feet in diameter, have also been met with, but no object of value has presented itself to indicate a town of much consequence, and it is therefore probable that its size was rather owing to its having been the abode of the many persons employed in bringing the natron to the Nile than to the importance it possessed as an Egyptian town. This opinion is further confirmed by the appearance of a large road leading to it from the south end of the Natron Valley, which is still followed by those who go from this part of the country to the Convent of St. Macarios.

The distance from Teráneh to Zakúk is about 38 miles, as measured by the pace of my camels and a pocket pedometer. This I have found to be an excellent instrument when compared with the camel's pace, though not altogether to be depended upon alone, as it varies in consequence of inequalities of ground and some other accidental causes, which cannot always be accurately allowed for. The road, on reaching the summit of the low hills that skirt the desert, continues upon a high plain with a slight ascent towards the W., varied by occasional hollows or undulations of ground for about 20 miles, and then descends as gradually for a distance of 8 miles more, when it arrives at the ridge of the Natron Valley, to which the descent is much more rapid, though of no very great depth. It is however evidently lower than the Valley of the Nile, and, judging by the eye as well as my barometer, a sensible difference exists between it and the plain of Egypt at Teráneh. Of three barometers which I brought to



Egypt, one only remained uninjured, which I took with me on this occasion, but even in this the mercury was not quite secure by the time I had reached Zakúk; and as the escape of a small quantity may render my observations not quite accurate, I have some scruples as to giving their results.

The village of Zakúk stands on the site of what is marked in Colonel Leake's map as an ancient glass-house, which is still visible beneath, and close to the house built about 12 years since by the Europeans who first established works there for drying the natron; and who founded this village, which now contains fifty or sixty huts and about 200 inhabitants of both sexes. The glass-house was probably of Roman times. It is built of stone and the scoria of common green glass; and pieces of the fused substance attached to the stones sufficiently indicate its site, as the rounded summits the form of three distinct ovens. The natron is found in the plain and in two or three of the lakes. It is principally taken from El Gúnfadîh and El Hámra Lakes. Two others, El Khortái and the lesser Mellahat é Jún, also produce this salt, but being very small they yield little, and the last is only frequented by the Arabs, who smuggle it to the Nile chiefly by the road through the Fyúm.

There are eight lakes which contain water all the year, and are called Mellahat (*Saline*). The largest and most southerly, called Om Rishieh, produces only muriate of soda, or common salt. Next to this in size is e' Jaár, also a salt lake; then El Gúnfadîh and El Hámra, both of which produce natron; then the larger Jún and e' Rasúnfeh, two salt lakes; and last of all, El Khortái and the lesser Jún, which two contain natron, and are much less than the preceding. There are two ponds or birkets, the Birket e' Shugáifeh, and the Birket e Rumáid, which contain water the greater part of the year, but are dry in summer; and a few other pools not worthy of notice, some of which contain natron of a bad quality.

In the lakes that yield natron and muriate of soda, the two salts crystallize separately; the latter above in a layer of about 18 inches thick, and the natron, varying in thickness according to the form of the bed of the lake, the thinnest being about 27 inches. All the lakes contain muriate of soda, though few produce natron; but I could not hear of any that yield sulphate of soda.

The water in the lakes varies much in height at different seasons of the year. March is the period when they are highest, and then they are all full. They begin to increase about the end of December, and continue to rise till the commencement of March, when they gradually decrease, and in May all the pools, and even the two larger birkets, are perfectly dry. The abundance of water in winter renders them less salt than in the sub-



sequent months; and even the height of the Mellahats diminishes greatly in summer, leaving the dry parts covered with an incrustation of muriate of soda or of natron, according to the nature of the salt they contain. The difference between the beds of the Birkets and those of the Mellahats, or salt and natron lakes, consists in those of the former, when the water has evaporated, being a muddy deposit, and of the two latter a firm incrustation; and it is at this time that the natron called Soltani is collected.

The natron consists of two kinds, the white and the Soltani, the latter taken from the bed of the lakes as the water retifes, the former from the low grounds that surround them, which are not inundated. This last is the best quality. It is prepared for use at the village by first washing and dissolving it in water, and then exposing it to the sun in an open court, from which it is removed to the ovens and placed over a fire in a large trough, till all the moisture is extracted; it is then put into a dry place to be carried to the Nile for exportation to Europe; the Soltani being taken in the state in which it is found direct to Cairo.

On measuring the specific gravity of the water, that of the lakes containing natron and salt is found to contain 35 kirát in summer, immediately before it dries up, and in January and February about 24 kecrát, the well-water of the village of Zakúk measuring 1, and that of the Nile zero; indeed there are several springs of fresh water in the Natron Valley; the purest of which are at the convents to the S.; that of Deir Baramus being slightly salt. The water evidently rises from and reposes on a bed of clay, which I found close to Zakúk and at the base of the hills to the westward; and I have no doubt from what I observed here and at the Oases, that it filters beneath the mountains that separate the Wady Natrún from the Nile, and being carried over the clay which constitutes the base of the Libyan chain, finds an exit in these low valleys, forming springs of fresh water in places where the soil is free from all saline matter, and salt springs, or ponds of natron when the earth through which it passes from the clay presents these substances deposited in one of the neighbouring strata. This is the case in many parts of Egypt; and in support of this opinion, I need only state, that the water of all its salt wells becomes much sweeter when a great quantity has been taken out, proving the water itself to be originally fresh and rendered salt by contact with earth containing saline matter.

It seems singular that the water of these lakes should begin to rise so long after the high Nile, a period of nearly three months. This can only be explained by the slowness of its passage through the strata of the mountains intervening between the river and this distant valley; and judging from the time the Nile water takes to ooze through the alluvial deposit of its banks to the edge of the

desert (frequently not more than a mile or two off), the time taken to reach the Natron Valley appears to be proportionate to the increase of distance.

The dip of the strata of the hills that border the Natron Valley is towards the N.E.; hence the descent to the two valleys (the Wady Natrún and the Wady-el-Fargh) is more rapid on the W. than the E., and this is consistent with the lower level of the former valley.

The Wady Natrún contains a very small population, the village of Zakúk and the four convents having altogether not more than 272 inhabitants; the village, as before stated, 200, and the convents 72; of which Deír Suriani claims 30, St. Macarios 22, Amba Bishoi 13, and Baramús 7. The inmates of all these convents, or rather monasteries, are Copts, each with a Gommos or superior, though the Baramús is said to be of Greek, as the Suriani of Syrian origin.

Besides natron, this valley produces rushes (Sumár) and bull-rushes (Birdi) used for making the well known mats of Egypt, which tend so much to the comfort of the Cairenes. Of the former the best kind of mats are made, called Menúfi, from the town where they are manufactured; of the latter, those of an inferior quality and most commonly used in the houses of Cairo, the Menúfi being principally confined to the houses of the rich. It is not, however, to the Natron Valley that Menúfi is indebted for the best rushes; those of El Maghra or Wady e' Sumar, "the Valley of Rushes," are greatly superior, and are brought across the desert expressly for this purpose. Wady e' Sumar is on the road to Siwah, and is 4 days from the Nile and 3 days from the Natron Lakes. The Natron Valley produces no trees. Some of the usual herbs of the desert, a few tamarisk bushes near the Deír Baramús, some stunted palms in the same direction, and others to the E. of St. Macarios, are the only vegetable productions, besides its reeds and rushes; and no attempt to rear the palm to the height and character of a tree has succeeded, owing no doubt to the many kinds of salt that corrupt the soil. The animals are the gazelle, jerboas, foxes, and a few others common to the Libyan hills; but I could find no one who had seen or heard of the stag, said by some travellers to frequent this district, and which is represented in the paintings of ancient Egypt as an inhabitant of the country.

The length of the Wady Natrún is about 22 miles, and its breadth, reckoning from the slope of the low hills that surround it,  $5\frac{1}{2}$  miles in the broadest part, though the actual level plain is not more than 2 miles, and is here and there studded with isolated hills and banks of rock covered with sand. The ascent towards Bahr-el-Fargh is very gradual, and the descent to that valley is

even more rapid than that of the eastern side of the Wady Natrûn; but the latter is deeper than its western neighbour, though inferior to it both in breadth and length. The hills that separate the two valleys are covered with rounded siliceous pebbles, pieces of petrified wood, and coarse gritstone mixed with loose sand, which are likewise found on the low banks that form the undulating ground of the Bahr-el-Fargh, the rocks that skirt it being a coarse sandstone. These agatised woods are mostly palm, a knotted tree, perhaps of a thorny kind, and a pointed stem resembling a cane, precisely the same as those that are found on the opposite side of the Nile on the summit of the Mokattam range behind Cairo. The pebbles and woods have probably been imbedded in a friable layer of sandstone, which having been decomposed has left these heavier bodies upon the surface of the stratum next beneath it, while its lighter particles carried off by the wind have contributed not a little to increase the quantity of sand in these districts; and indeed the rock immediately below is of a texture scarcely more compact than that which I suppose to have been thus removed.

The Bahr-el-Fargh, or, as it is less frequently called, *Bahr-bela-ma*, runs towards El Maghra, or the Wady e' Sumar, on the Siwah road on one side, and to the back of the mountains at the western end of the Lake Meris on the other, and a branch also extends to the valley of the Nile, a little below Abû Roâsh, 6 or 7 miles N. of the Pyramids of Gizeh. The hills that border it are indented here and there, as its bed is varied by numerous projecting ridges so as to deprive it of all the character of a river, which many have supposed it originally to have been. Some have even claimed it for the Nile, as an old bed of that river, seeing in the petrified wood found within its bed and on the adjacent hills the remains of boats that navigated this ancient channel. What had become of the alluvial deposit of this fertilising river they fail to tell us, and it is only surprising that they did not avail themselves of the clay on which the mountains repose to support their theory, though it might be difficult to explain the voluminousness of the superincumbent rocks intervening between this district and the valley of Egypt. But without requiring the aid of the Nile to form a valley unmarked by the most ordinary features of a river's course, we see in it the effect of a similar cause to that which at an early period formed other low Wadies in the Libyan desert, as its neighbour the Wady Natrûn, the Oases, and other valleys also called *Bahr-bela-ma*. Really, if the Nile were called upon to account for all the depressions below its own level in the western desert, it would be justified in claiming for itself an antiquity and a power of ubiquity



with which neither the age of the world nor the nature of rivers admits of.

In the construction of the accompanying map I have calculated the distance from the Nile, as before stated, by the pedometer and camel's pace; the two valleys are laid down by observed latitudes, by measured base-lines, and by a series of numerous triangles, and I only regret that my health would not allow me to follow the Bahr-el-Fargh to the Fyúm. It would be curious to trace its whole course, and every one might do this with a small escort of Arabs, whom it would be better to take from the Fyúm, and by turning aside or sending for water to the Natron Valley, the journey might be continued to the basis of Siwah, following the Wady-el-Fargh as far as the latitude of Wady e' Sumar, close to which it is said to pass.

That this small survey adds very little to our geographical knowledge of Egypt I willingly confess, and it may be unworthy of presentation to the Society; but I have thought it better to offer whatever geographical information is obtained by actual observation, however unimportant in itself, to show at least my wish to promote the object they have in view, while I regret my inability to offer matter more deserving of attention.

V.—*Routes in the Nizam's Territory.* From the Journals of Captain J. R. WILSON, of the Nizam's service.

[THE following routes throw some light on the geography of a country of which less is known than might have been expected, considering the important military operations of which it has been the scene. They are extracted from the Journals kept by Captain Wilson in 1830 and 1831, when his regiment formed part of the "Hyderabad subsidiary force." Great part of these Journals is occupied with such historical, political, and military details as naturally had most interest for the author. The tabulated routes, with the remarks attached to them, are almost all that can be said to concern the geographer. The descriptions of Bolarum, Sekunderabad, and Hyderabad, have however also been extracted, from the lively idea they convey of the appearance impressed upon that region by the mixture of Europeans with the natives, and the mercenary troops collected by their chiefs from all regions of the East. The first route is that along which Captain Wilson marched in February, 1830, when his regiment was sent to occupy the station of Muktul. The other three routes traverse the territory on the Kistnah and Tumbudrah, in

the vicinity of Muktul, in the directions of W., E., and S.W. These marches were made by Captain Wilson in the course of expeditions made by his regiment from Muktul in 1830-31, sometimes to reduce disobedient rajahs, sometimes to liberate the rajahs from the thralldom of their foreign mercenaries.]

ROUTE I.—FROM BOLARUM TO MUKTUL (February, 1830).

Bolarum, or "Ulwal," as the natives call it, is considered the most healthy cantonment in the Nizam's dominions, from its being situated on such high ground, and is continually resorted to by the officers of the adjoining station (Sekunderabad) for change of air. In the year 1833 the latter place was visited with a great deal of sickness, which made so much havoc among the troops that there was scarcely a regiment fit for duty, nor was health restored amongst them until they were separated, and marched out a short distance into the country, where they were quartered in tents for a fortnight or three weeks. The camp-followers suffered severely; and it is said that a few of them, mostly women, to put an end to their agonies, went and threw themselves into wells. Bolarum, during this period, was perfectly free from sickness; and, as far as the writer can remember, there were not more than eighteen or twenty patients in the regimental hospitals, and those all ordinary cases. Cholera scarcely or ever prevails in the Lines or its immediate neighbourhood, which is another proof of the salubrity of the climate of this part of India, although only distant 6 miles from a large force which at times suffers so much, and scarcely able to take the duties of the station. The liver complaint appears to be more prevalent amongst the Europeans, which often proves fatal; but although the district of Hyderabad is said to be noted for it, still it is a question whether it is not brought on by unnecessary exposure to the sun, which is very powerful in the hot season, and hard living. The former course is too much pursued by the officers and others who can afford to keep their gun, as the country abounds with game of all sorts in their season, and affords to the sportsman a good day's shooting. Wild animals, such as the tiger, leopard, hyena, panther, bear, hog, &c., are often to be met with in the jungles close at hand. In fact, the two former have even been known to pay the immediate environs a visit, when they have been eagerly pursued and destroyed.

With regard to the sights in the vicinity of Bolarum there are only two of any note. The first is a large Hindû temple at the adjoining village of Ulwal, at which a grand festival is held annually, when the minister, and many of the noblemen at the court of his highness the Nizam, all of the Hindû persuasion,

attend in state to perform certain religious ceremonies. This festival generally lasts two or three days, during which time there is a great deal going on which amuses the native spectators; but Europeans in general get tired of such sights, as they are blended with superstitious and idolatrous rites.

The second sight alluded to is the gorgeous procession of the Nizam himself, who, together with his courtiers, also attend an annual Mahomedan festival held at Múllah Ali (distant 3 miles), in commemoration of a saint of that name, a figure of whose hand is erected on a high rock in the vicinity, at which not only they, but upwards of a hundred thousand followers of the false prophet, make their obeisance.

On the 8th of February, 1830, the writer proceeded to Muktul, visiting Sekunderabad *en route*, to which station, as well as far as the foundry, the road is excellent, and constantly kept in repair. The country is well cultivated with rice; and in many parts a delicious fruit called the sitah-phúl, or custard-apple, grows quite wild, and in great abundance. The natives state that this fruit was the means of saving the lives of many of the inhabitants during a famine some years ago, for which reason a law was enacted, that if any person was found cutting down a branch of the tree, he should be punished with the loss of his right arm. Whether this law was ever enforced it is difficult to find out, but it is certain that it is now completely done away with.

Sekunderabad is the head-quarters of the "Hyderabad subsidiary force."

The cantonment of Sekunderabad is one of the largest of the presidency to which it is attached; and although it is not considered healthy for many months in the year, still the majority of Europeans and natives have hitherto preferred being stationed there to other places, owing to their receiving "full batta," or extra field allowance. It is situated 394 miles N.N.W. from Madras, in about the same latitude and longitude as Hyderabad, from which it is only 5 miles and 6 furlongs distant, so that if any serious disturbance should break out, it would be an easy matter to put it down with such a large force at hand, aided by the Nizam's troops at Bolarum.

The bazaars, both general and regimental, of the station of Sekunderabad are very excellent, and under the superintendence of officers attached to the commissariat department of the army; they are kept well supplied with provisions of every description, although at higher prices than at the other cantonments in the Nizam's dominions, owing, it would appear, from the densely populated capital being situated so near. Several large shops have been opened by Parsis and others, where European goods are procurable, but of late years these have fallen off much, as



the officers take advantage of their messes, and send either direct to England or to the presidencies for whatever they require; besides which, several native merchants come up annually from Bombay with large investments, which are generally of better quality and cheaper than those ordered by the established shopkeepers. Before proceeding with the journal of the route to Muktul, it may be as well to add that Sekunderabad is noted for its places of public amusement, amongst which the "Hyderabad Club" is most worthy the attention of the officers of the Madras presidency and the Nizam's army, whose corps are liable in their turn to be stationed in that part of India. Balls are given monthly by the subscribers to the public rooms, and on especial occasions by the officers of the different regiments, or by private individuals. The theatre is scarcely or ever open at the present period, owing to there being but a few gentlemen who take any interest in theatricals. Races are held once a-year at Múllah Ali, where a stand has been erected for the accommodation of those who attend them; but this amusement has also fallen off, from the principal studs having been broken up, and their owners having either died or retired from the turf. Rackets, quoits, cricket, fives, billiards, &c., are often the order of the day, and those who take part in them moderately and at proper hours, find that their health improves from the exercise. Public libraries have been established both here and at Bolaram, which, in the writer's opinion, are very necessary in all stations throughout India, for without some food for the mind one's life, especially in a country where ignorance prevails, and the climate so sultry as to prevent one going out at times to admire the works of nature, would pass away miserably.

Immediately after leaving Sekunderabad, the traveller passes a lake on his right, which in the rainy season is estimated at fourteen or fifteen miles in circumference. The bund or embankment is wonderfully constructed, about a mile in length, and wide enough to admit of two conveyances passing each other without any fear of coming in contact. It is the favourite resort of the European community in the early part of the morning and after sunset, when the scenery is so very striking and beautiful, that it cannot fail to attract the attention of the most casual observer. On the traveller's left below the bund, the country for a mile or two appears to be richly cultivated with rice, interspersed with date and mango groves, gardens, small villages, ruins of tombs, mosques, &c., the whole backed by mountains at a distance. On the south the foundry, and the seat of the late Sir William Rumbold, Bart., now in the possession of a native; and on the north the cantonment, church, and many other public buildings meet the eye, which, together with the boats that are

constantly sailing about the lake, add much to the beauty of the views by which one is surrounded. Parties of officers and ladies avail themselves of every favourable opportunity, and go out for a few hours' pleasure on the water; sometimes accompanied by a military band. The lake supplies the residents with fish of every description; amongst them the murl (about the size of a cod) is considered the best. Alligators are to be met with sometimes, but it scarcely or ever happens that they commit any mischief. The natives are never permitted to ride or drive over the bund, for which reason a guard of infantry is posted at both ends of it, to make them keep to a road which has been expressly marked out for them immediately below it. This rule of course would not affect the Nizam, or any one attached to his court, who, excepting on very grand occasions, never come out in this direction.

Proceeding onwards for about a quarter of a mile from the bund, the traveller reaches the foundry, which at the present period is scarcely worth visiting, as no pieces of ordnance have been cast there for many years past.

After passing the foundry, which is situated on rather high ground, the residency, or, as the natives call it, "chudder ghât," and the city of Hyderabad, come suddenly to view. The former is about a mile and a half from the direct road to Muktul on its left, and is one of the most magnificent buildings in India. It was built for the accommodation of the British representative at the court of his highness the Nizam, and his assistants, and was commenced whilst Colonel Kirkpatrick filled that high situation, under the superintendence of a young officer of the Honourable Company's engineers on the Madras establishment. It stands on a spot of ground most tastefully laid out, enclosed by a high wall on either side, and has a large garden, fountains, a racket-court, and several offices, outhouses, &c., attached to it. In the garden there is a model of the building itself, which is very minutely executed, and cannot fail to attract attention. The gateways, especially the one facing the city, are also neatly constructed, and on the approach of the traveller to either of them, he will at once be enabled to form an idea of the splendour of the premises to which they give access. There are several other large buildings in this neighbourhood, occupied by Europeans, who are either attached to the staff of the British representative, or who have set up themselves in business on their own responsibility. Another object which is worthy of notice is a large bridge built a few years ago over the Mússey river, which separates the residency from the city. It has been much admired by those who have seen it, as it is a most stupendous work, and reflects great credit on the engineer officers under whose orders it

was raised, especially as it was partly washed away before it was completed. The river during the rainy season comes down with great violence, and on more than one occasion has swept off some of the inhabitants, who reside on both banks of it.

The next place which the traveller ought to explore is the city, situated on the right bank of the river just alluded to, in lat.  $17^{\circ} 20'$  N. and long.  $78^{\circ} 50'$  E. It is the capital, and the headquarters of his highness the Nawab Asaph Jah Muzaffer-ul-Mumalik, Mir Furkudah Ali Khan Bahadur, Futeh Jung, Nizam of Hyderabad, or, as he is otherwise styled, the Sâbadâr of the Deccan. This Mahomedan state contains an area of 88,884 square miles, and is completely kept under subjection to the British and Nizami's flags by the latter's army, composed of four companies of artillery (Golundauz), five regiments of cavalry, eight regiments of infantry, one company of pioneers, and one company of hill-rangers (lately raised), the whole under the orders of European officers, aided by the troops of the Madras establishment stationed at Sekunderabad and Jalnah.

The traveller to obtain admission into the city of Hyderabad must have the permission of the British representative, who will on application provide him with a "chobdar," or, if the writer may be allowed to translate it, "silver stick in waiting," for the purpose of escorting him through it, which in itself will protect him from having those insults heaped upon him which strangers who venture in on their own responsibility generally meet with from the mob. The population is immense, principally Mahomedan, amongst whom are Rohillas, Arabs, Afghans, Puthâns, &c., employed as soldiers by the local government, nobility, and richer merchants, who are constantly fighting amongst themselves, and cause a great deal of bloodshed, sometimes attended by loss of life.

There is no city in India in which so much cruelty, injustice, and crime is practised as at Hyderabad; which is not to be wondered at when so many of the greatest offenders are permitted to escape unpunished on payment of a "nuzzeranah," or an offering of a sum of money to government.

Of the sights in the city, which are worth recording, none can be more interesting than the palaces of the Nawabs Alum Ali, Sûraj-ul-Daulah Bahadur, Shumsir-ul-Oura, and the minister Maharajah Rajah Chundulal Bahadur. Those of the former nobleman are very striking, and laid out in the Oriental style, especially the gardens attached to them. In one is contained a hall of mirrors, of large dimensions, something similar to that at Vauxhall Gardens, differing only in the ceiling, which is also a mass of the same material. In another is a smaller sized hall, the walls and ceiling of which are completely studded



with china-ware, of the choicest description, such as breakfast, dinner, and dessert sets. This mode of building rooms is quite novel to the European eye, at the same time ridiculous, but it is certainly a great curiosity, and shows that the natives have a taste for articles of European manufacture, and think nothing of spending large sums of money in the purchase of them. Their palaces are generally well furnished; and the one outside the city, between the foundry and the residency, belonging to the nobleman in question, is a fine specimen of a country-seat. It is built after the model of the residency, and although not so large and magnificent, still may be classed with some of the best buildings in India. The palaces belonging to the Nawab Shumsfr-ül-Omra are of a different sort. The one in the city is of the Oriental style of structure; and, in addition to the furniture, it contains a collection of pictures (some of them not displaying good taste), shells, stuffed and live birds, &c. He has lately expended a small fortune in building a most magnificent seat, a short distance to the S. of the city, near the Bibi-ke-Chusmah. The writer was much struck with the appearance of it when he first visited it, and could not help admiring this nobleman's taste, not only in the structure of this mansion, but in the selection of the furniture, chandeliers, lamps, mirrors, &c., which are all of European manufacture, and match in splendour.

There are many other buildings of note, too numerous to detail, amongst which the Châr-Minar, or Four Minarets, is as conspicuous as the Monument in London; from the summit of which a very good view of the city and its neighbourhood meets the eye. The French Garden, situated about a mile to the N.N.E. of the residency, is often visited by travellers for its antiquity. It was formerly a station occupied by the Nizam's troops when under the orders of French officers, but since they were disbanded it has never been occupied, and consequently allowed to fall into a heap of ruins. Not the slightest vestige of the regimental lines is visible now; and the few houses which remain are in a tottering state, and only used, for pic-nic and other parties, by the officers at Sekunderabad and Bolarum. In this neighbourhood a very grand battle was once fought between the Puthâns and Arabs, which terminated in the former party being turned out of the Nizam's dominions; but within the last ten years they have been gradually returning to their former homes. A spot of ground near Chinchul Ghorah is pointed out by the inhabitants as the field of battle; to mark which many stones have been erected, one would suppose, to the memory of those who fell on that occasion. The Puthâns, as well as Arabs, are a very turbulent race of people, and have had a great deal to do with many of the disturbances which from time to time have broken out at Hyderabad.

The expulsion from the country of the latter would be a very desirable object; but, owing to their being a very formidable party, it could not be effected without great loss of life. The Rohillas were not so powerful, therefore government found it an easy matter to get rid of them with the aid of the Nizam's troops.

In taking leave of Hyderabad the writer cannot omit to mention one of the most extraordinary, at the same time whimsical, features of his highness the Nizam's court, which of course has been handed down to him by his long line of ancestors. The princes and nobility of the East are noted for keeping large seraglios of women; and his highness, to keep pace with them, has a considerable one attached to his household; for the protection of which a corps of their own sex was raised many years ago, armed and accoutred like other regiments of the line, but not in such a superior style. Their commissioned and non-commissioned officers are also women, and are much more expert in the performance of their respective duties than one would imagine. It has been said by some, who have been so fortunate as to have got a glimpse of this gallant corps whilst at exercise, that they have gone through their field-movements in a manner highly amusing; and, if one were to judge from their appearance on duty around the seraglio and other places, it certainly must be a sight, above all others at Hyderabad, worth seeing. The sentries may be observed at all times very alert on their posts, excepting in the case of those who may have an infant to take care of, when perhaps one hand may be employed in holding a musket whilst the other is engaged in nursing. Women in this condition must find it a very difficult matter to conduct their duties to the satisfaction of their superiors. The husbands of these Amazons have nothing whatever to say to the regiment, and follow their own occupations, either under government or upon their own responsibility.

The fortress of Golcondah, situated in lat.  $17^{\circ} 20' N.$ , and long.  $72^{\circ} 52' E.$ , about 4 miles to the right of the road, is the next place to be mentioned. It is supposed to contain treasure to a very large amount; and therefore Europeans or native strangers are not allowed to enter its gates: in short, if they were to attempt it, without especial permission from government, they would, in all probability, be fired at by the soldiers on duty on the ramparts.

Within a few yards of the northern face of the fortress are situated the famous "Tombs of Golcondah," which are something similar to those of Beder, and of the Kútub Shah dynasty, their relatives and principal dependants. That of the founder of the dynasty is, consequently, 300 years old, and the most recent ones 150 years. Parties of officers and ladies from Sekunderabad and

Bolarum often visit them, and pass the day either in the cleanest and largest one, or in tents in their immediate neighbourhood.

The Tarbund also, to the right of the road, should be visited by the traveller. It is an embankment to a lake, built, some years ago, by the same engineer-officer who is alluded to in the description of the residency of Hyderabad, and is much superior in strength to any other in the Nizam's dominions. The construction of it is on the principle of arches, about three-quarters of a mile in length, and only wide enough to admit of two persons walking abreast of each other without any inconvenience. The scenery around it is very beautiful, which comprises a view of the city and its suburbs, the lake itself, with a picturesque island in the centre of it, and the hilly country at the back. If this embankment had not been built, the city, in the event of a very heavy rainy season, would be totally inundated, as the innumerable little streams from the hills, which now form the lake, would flow into Moossey river immediately below the walls, and, from the great rush of waters, overflow its banks.

From Bolarum to Lútrontah, 2 miles; Trimmellagherry, 2 miles; Sekunderabad, 2 miles; Hússeinsagbur Tank, 1 mile; Foundry, 1 mile 2 furlongs.—total, 8 miles 2 furlongs. Excellent road all the way, and the country well cultivated with rice for the most part of the year.

Begum Bazaar, 1 mile 6 furlongs; bridge over the Mússey river to the west gate of Hyderabad, 2 miles; Tarbund, 1 mile; Shumsabad, 9 miles—total, 13 miles 6 furlongs. Pretty good road, and the country cultivated as on the last stage. This is a large fortified town, a little to the left of the road, and is famous for its trade in coffee, sugar-candy, and sugar: the former article is imported from Mocha, *viâ* Bombay, principally for the consumption of the Arabs at Hyderabad and its vicinity.

Túdapilly, 2 miles 1 furlong; Shapúr, 3 miles 3 furlongs; Palmacul, 5 miles 2 furlongs; Cottúr, 3 miles; Nundigaú, 2 miles 6 furlongs—total, 14 miles 4 furlongs. The road from Shumsabad to this place is in many parts very stony, through bushy country, cultivated only near the villages with rice and other grain.

Janumpettah, 4 miles 7 furlongs; Furrucknaghur fort, 1 furlong; Rycul, 4 miles 6 furlongs; Bolanaghur, Nagumpillar, on the Dhái Nullah, 4 miles—total, 13 miles 6 furlongs. (A building in the centre of this town is generally resorted to by travellers to alight at.) The road and cultivation in the same state as on the last stage. It is related by the natives of this place that in the time of their ancestors many travellers were put to death on the banks of an adjoining rivulet called the Dhái



Nullah. A person under the garb of a Fakir, who was at the head of these horrid murderers, was seized and executed on the spot by order of the Nizam's government; after which, on searching his house, property to a great amount was found concealed under ground. This practice is now discontinued; therefore it is to be hoped the present generation are getting more civilised, and look with horror on the crimes which have left such a foul blot in the history of their ancestors.

Cross a rivulet to Pidapillí, 6 furlongs; Palamúsíah, 2 miles 5 furlongs; Rajahpett, 2 miles 7 furlongs; Naccáh Waggú, 1 mile; Múdaréddapillí (deserted), 6 furlongs;  $\frac{1}{2}$  fr. Nursarum, 2 miles; Caurumpett, 2 miles 4 furlongs—total, 12 miles 4 furlongs. Good road through bushy country, but partly cultivated with rice.

Jurehillah mud fort, 6 furlongs; Appunnapillí, 5 miles 2 furlongs; Yamagúndah, 1 mile 3 furlongs; Paulamúr, 3 miles 7 furlongs—total, 11 miles 2 furlongs. Pretty good road through bushy and hilly country; cultivated as on the last stage. There is a shorter road by 6 or 7 miles from Bolanaghur to this place, which lies to the right, through a range of hills, but not passable for carts.

Durmapúr, 1 mile 4 furlongs; Candurcuddy (deserted), 8 miles; large tank to the right, 2 miles 4 furlongs; Húkhú Cluttú Waggú, 1 mile 2 furlongs; Dewarcúdry, 2 furlongs—total, 13 miles 4 furlongs. Bad road, through low bushy country, but poorly cultivated. There is a Hindú temple here, at which travellers alight.

Peedah Waggú, 1 mile 4 furlongs; Bundrapillí, 2 miles; 4 fr. Gopaulpúram, 1 mile; Murcul, 3 miles 4 furlongs; Ellagúndah, 2 miles 7 furlongs—total, 10 miles 7 furlongs. Good road through open country; better cultivated than on the last stage.

Gúdahgúndlah, 2 miles 7 furlongs; Jaukailair, 2 miles 1 furlong; Hausowarrum, 3 miles 2 furlongs; Muktul, 5 miles 3 furlongs—total, 13 miles 5 furlongs. Good road through open country, covered with long grass. This place lies S.W. of Bolarum, in lat.  $16^{\circ} 29'$  N., and long.  $77^{\circ} 31'$  E., and was only occupied by the Nizam's troops in the latter end of 1829 or commencement of 1830. The new cantonment is situated to the eastward of the town on an eminence, and only contains one regiment of native infantry: it was formed for the purpose of keeping the surrounding country quiet, which a few months before was in a state of rebellion; nor would peace again have been restored had not a small disciplined force been ordered out to put down all the refractory rajahs.

Muktul as a station is a very important one, but is far from

being healthy for many parts of the year, especially for native troops. Dysentery and fevers appear to be the prevailing maladies. There are no objects whatever, either at Muktul or its immediate neighbourhood, worth visiting, and the only amusement which the officers of the cantonment and travellers meet with is shooting, of which there is abundance, as the country is well stocked with game of every description in their season. Bustard and florican are the principal birds which come under the notice of the sportsman. Wild beasts, excepting jackals and wolves, are scarcely ever heard of in the plains, but are sometimes seen in the hills on the right of the road from Bolaram.

ROUTE II.—FROM MUKTUL INTO THE GOPAULPETT DISTRICT.  
(16th March to 3rd April, 1830.)

From Muktul to Colaypilli, 1 mile 4 furlongs; Muntungûdum, 4 miles 4 furlongs; Rajahpilli, 2 miles; Nurwah, 2 miles; head-quarters' flag, W. of Yaumki Tank, 1 mile—total, 11 miles. Good road all the way, through open country, cultivated only near the different villages with rice. Encamped on a spacious piece of ground on the W. of the tank, and in the vicinity of a grove of young mangoe-trees.

Yaumki, 6 furlongs; Nagareddapilly, 3 miles 2 furlongs; Paumreddapilly, 3 miles; head-quarters' flag, Amerihuntah, 1 mile—total, 8 miles. Good road through bushy country, cultivated as on the last stage. This is a large market-town, and is famous for its manufactures of native cloths, and its potteries. Encamped on rather confined ground.

Dûpulli, 4 miles; Kûkhû Cluttû Rivulet, 2 miles 4 furlongs; Nellorree, 4 furlongs; Dautahpoor (deserted), 2 miles; head-quarters' flag, Cotah Cotah, 3 miles—total, 12 miles. Stony road through very bushy, hilly, and uncultivated country. This is also a market-town. Encamped in an extensive mangoe grove.

1 f. r. Rajahpett, 3 miles 6 furlongs; Nagahrum, 3 miles 2 furlongs; head-quarters' flag, Wunpurty, 1 mile—total, 8 miles. The road and country in the same state as on the last stage. This place is very strongly fortified, owing to its being the head-quarters of the chief of the district, who came to visit us during the day we were encamped under its walls. A few months after this interview, during the absence of the writer on sick leave, he fell under the displeasure of the Nizam's government, when a similar force was sent against him.

Narsingapilly, 1 mile; Tarpurty, 1 mile 4 furlongs; head-quarters' flag, Gopaulpett, 1 mile 4 furlongs—total, 4 miles. Pretty good road through hilly, bushy, and uncultivated country, the latter owing to the villages being deserted. Took possession

of the town and ghurry (fort) immediately on the arrival of the force, without meeting with any opposition on the part of the rajah, who with his followers had evacuated both places on hearing of our approach. Encamped on an open space of ground a little distance from the south gate, where we remained two days, in order to place the government agent in possession of all the villages belonging to the rajah in the neighbourhood of his capital, in which we stationed a company of infantry until our return from other parts of the district. Gopaulpett is situated E.S.E. of Muktul, distant 43 miles, in lat. 16° 25' N., and long. 78° 10' E.

Tarpurty, 1 mile 4 furlongs; Múnahnúr, 2 miles; Gopaulpúram, 6 miles 4 furlongs; head-quarters' flag, Paungull Hill Fort, 2 miles—total, 12 miles. Very bad road, through hilly, thickly-wooded, and uncultivated country. Encamped to the W. of the Hill Fort, on rather confined ground, in the vicinity of a date-grove. The thermometer at this place stood as high as 120° in tents, and 150° in the sun. Halted the following day for the purpose of allowing the government agent time to rejoin us from Gopaulpett.

Heytapilly, 4 miles 6 furlongs; Walwahpúram (deserted), 2 miles 2 furlongs; Túncontah, 3 miles 7 furlongs; Condúr, 2 miles 1 furlong; head-quarters' flag, Páinully, 2 miles—total, 15 miles. Good road through uncultivated country. This is rather a large town, belonging to the Rajah of Jhutpor; and we were obliged to resort to it in consequence of finding the village of Toomecontah deserted, which was taken possession of, and made over to the government agent. Encamped on an open piece of ground, where we halted two days for the purpose of settling some important matters connected with the complaint against the Rajah of Gopaulpett.

Yainahpettah, 4 miles; Jahpullah, 4 furlongs; Churgotum, 4 furlongs; Yettum, head-quarters' flag, 4 miles—total, 9 miles. Rather stony road, and the country cultivated with rice. Encamped on hard confined ground. This place belongs to the Rajah Sinahvishráo, and is his head-quarters. It appears that he was also under the displeasure of government, in consequence of which he was apprehensive his possessions would be taken from him.

Nahgahrum, or Nabgahpilly, 3 miles 4 furlongs; Mútahredapilly, 2 miles; Túrkahdúllý, 2 miles 4 furlongs; Chillahgú Rivulet, 1 mile; Chinwarrum, 2 miles; Yaideotlah, 2 miles; Gopaulpett, 3 miles—total, 16 miles. Pretty good road, through country partly cultivated. Encamped on a fine spot of ground nearly a mile from this place.

The country through which the force passed abounds with game of every description, which, notwithstanding the very sultry



state of the weather, was a source of great amusement to those officers who were fond of shooting, and tended to break the monotony of the campaign.

### ROUTE III.—FROM MUKTUL TO SHORAPOR (April and May, 1831).

From Muktul to Sungumbundah, cross Shímah river, Nirgaon, Dúpullí, head-quarters' flag, Cuddachúr, 12 miles. Good road all the way, and the country cultivated near the villages. Encamped in a tamarind-grove.

Chatahpilly, Múnigallah, Belgondah, Paidah Anúr, cross Bímah river, head-quarters' flag, 2 furlongs from Billaúr, 12 miles. Road and cultivation as on the last stage. Encamped on an open space of ground (black soil) on the right bank of the Bheemah river.

Kundaillí, Konichully, Wudgherry, head-quarters' flag, Aikúr, 12 miles. Bad road over black and broken soil, bearing every sign of having been well cultivated prior to the disputes between the Rajah of Shorapor and some of his Arabs. Encamped on the left bank of the River Kistnah on stony ground.

Aihaul, Mudrakul, Bírúúr, Sutchumpúr, cross a rivulet, head-quarters' flag, near Kanahpúr, and about 1 mile from Shorapor, 14 miles. Good road, and the cultivation in the same state as on the last stage.

Shorapor, the capital of the territory of that name, is a strongly fortified town in a range of mountains, and is now in the possession of the Rajah Kistnapah Naik Bulwunt Bleyri Bahadúr. From Captain Clune's account of the Hindú chiefs in India, it would appear that the ancestor of this rajah was made a royal Munsubdar of 5000, and a Rajah, for having aided Aurungzebe in the subjugation of the Bájapúr State, of which he was a subject. The territory of Shorapor is situated between the Kistnah and Bhímah rivers, immediately above the junction, and is about 45 miles from E. to W., its greatest length. The former rajahs purchased a nominal independence by paying an annual tribute to both the Nizam and Peishwah. The first received 1,45,000 rupees, and the latter claimed 85,000 rupees, and each also levied a fine on the accession of a new rajah. The family and all their principal dependants are behdurs, or the Rahmonassie tribe. The revenue of the state, from all sources, formerly amounted to 8 lakhs annually, but now it does not exceed 5 lakhs, which, after what is deducted for the Nizam's government, is barely sufficient to maintain the dignity of the present rajah. In 1802, the troops which had been collected to resist the Nizam's army were estimated at 4000 cavalry, 8000 infantry, and

4000 behdurs as a militia force, who, as in England, were only employed on very urgent occasions. The present number, however, does not probably amount to 2000 men on regular pay, so that it would be an easy matter at any time to subdue the state, although there are several strong forts in it, such as Shorapor, Wakenkhairah, Windrûg, and Gurketah. Shorapor lies in lat.  $16^{\circ} 32'$  N. and long.  $76^{\circ} 50'$  E.

ROUTE IV.—FROM MUKTUL TO SINDNÛR. (August, 1831, to January, 1832.)

From the lines to the town of Muktul, 1 mile; Chundapûr, 1 mile; cross a rivulet to Magnûr, 4 miles 2 furlongs; head-quarters' flag, Gûdûbalûr, 4 miles 2 furlongs—total, 10 miles 4 furlongs. Good roads all the way, and the country well cultivated. Encamped on the S.W. side of the village on an open space of ground.

Cross Kistnah river, 3 miles 3 furlongs; head-quarters' flag, Diva Sûgûr, 5 furlongs; r. l. f. Bowennibeuchli, 1 mile; l.  $\frac{1}{2}$  f. Heygushunhully, 4 miles 2 furlongs; Chickah Sûgûr, 2 furlongs; Yerrainurru, 3 miles 4 furlongs; head-quarters' flag, Raichor, 4 miles—total, 17 miles. Muddy roads over cotton or black soil well cultivated. Encamped in the first place on the right bank of the Kistnah river for the purpose of allowing our men time to cross in basket-boats, and on the arrival of the detachment at Raichor, took up a position near the walls facing W. European officers' tents pitched in a garden belonging to the Nizam. This is a very large town, and the fort is the strongest of the kind in this part of the country.

Ussûr, 3 miles; Rampûram, 2 furlongs; a tower and well, 5 miles; Kullûr, 5 miles; Kûrldi, head-quarters' flag, 7 miles 4 furlongs—total, 20 miles 6 furlongs. Good road over cotton soil, and well cultivated. Encamped on an open space of ground near the village.

Bohil Merchair, 2 miles 3 furlongs; Mirkul, 3 miles; Sikul, 2 miles; head-quarters' flag, Bhumrû, 7 miles—total, 14 miles 3 furlongs. Road and cultivation as on the last stage. Encamped on the ground on stony ground. This is a large town at the foot of rather a strong fortified hill.

Nundîarh, 3 miles 4 furlongs; Kotunkull, 8 miles; cross a rivulet, 4 miles 3 furlongs; head-quarters' flag, Yupulpurwî, 1 furlong—total, 16 miles. Muddy road over cotton soil, very well cultivated. Encamped near the village on the right bank of the rivulet. Halted here about a month.

r. 1 mile, Jaulghirah, 6 miles 2 furlongs; head-quarters' flag, Lindnoor, 12 miles 2 furlongs—total, 18 miles 4 furlongs. The

former part of the road muddy, and the latter good, partly over cotton soil well cultivated. Encamped on the right bank of a rivulet near the town. This is a very large place, principally inhabited by Bídurs, a noble race of people in appearance, but of low caste amongst the Hindús. It is to be remarked here that even the lads from twelve to sixteen years of age in these districts are formed into a kind of militia, and used by the different zemindars whenever they pick a quarrel amongst themselves.

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## ANALYSES.

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- I.—*Travels through the Alps of Savoy, and other parts of the Pennine Chain; with Observations on the Phenomena of Glaciers.*  
By JAMES D. FORBES, F.R.S. Ed., F.G.S., Corresponding Member of the Institute of France, and Professor of Natural Philosophy in the University of Edinburgh. Edinburgh: A. & C. Black; London: Longman, Brown, Green, & Longman. 1843. [By the Editor.]

IT is, we believe, generally admitted that Professor Forbes has by this work, and also by his papers in the *Edinburgh Review*, and various scientific journals, contributed materially to promote the development and rectification of the theory of glaciers. It is, however, as a contribution to positive geography that we propose to examine the volume now before us. And in this point of view its importance will be found to be scarcely, if at all, inferior to those attributed to it as a work of speculative science.

Professor Forbes, in his '*Travels*,' reads an important prudential lesson to geographers, though this does not appear to have been one of his objects in writing.

It is evident, from many incidental remarks, that the best modern maps of the Pennine Chain of Alps are lamentably in error. "One would hardly guess," he says at p. 216, "from the common maps, that Mont Blanc and its adjacent tributaries\* form a kind of oval group, rather than a portion of a line of mountains continuous from the Mediterranean to the Tyrol." At p. 270 he says, "I have not met with a description of the Col des Fenêtres in any work." At p. 289, adverting to the almost unknown lateral valleys which open into the Rhone valley at the well-known stages on the Simplon road, Sion, Sierre, and Tourtemagne, he observes:—"His [Fröbel's] work is valuable, from an improved map which it contains, and which corrects many of the almost incredible errors of the best executed maps before that time [1840], such as those of Weiss, Keller, and Wörl." At pp. 303-4 some startling errors of Wörl, Keller, and Von Welden are specified. And at p. 350 we meet with the following explicit passage:—

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\* This is a strange expression: "tributary streams," though a figurative expression, which has introduced much vagueness into geographical description, is intelligible; but "tributary mountains" is a phrase to which no idea can be attached.—*Ed.*

"I must say a word here respecting the maps of this country [the vicinity of Zermatt], which are worse than those, perhaps, of any other part of the Alps, and are all nearly equally bad, though with a great diversity of errors, which, showing that the artists have copied neither nature nor one another, leaves us to consider them as pure fabrications. Thus, in the map of apparently most authority of any—Von Welden's—attached to a work professedly geodetical and topographical, whilst the Italian side of the mountain [Monte Rosa] and its valleys are neatly and well laid down, the northern or Swiss side is a mass of pure invention, in which the most obvious features are nowhere to be found, and villages and glaciers, lakes and mountains, are jumbled into inextricable confusion. Take the easily accessible neighbourhood of Zermatt:—The great glacier of Gorner is to be recognised only by its name (Zermatt Gletscher), and *debouches* on a lake which has no existence; the Riffel and the glacier of Zmutt are nowhere! Nor is the valley of Saas better. The Matmark See, a lake below Distelberg, is supplanted by an imaginary glacier, composed of tributaries from all sides, and across which the path of the Moro is carried. A very pretty and detailed map of the Simplon pass and its neighbourhood, published by authority, replaces the great glacier of Macugnaga by a great lake! Wörl, in his map, has copied Von Welden's errors. Even the new government map of Sardinia, of which a sheet has lately appeared, has perpetuated blunders even worse than those of Von Welden's, and in exquisite engraving. Lakes are created, villages are displaced, and others which have no existence inserted where glaciers should be! The Italian side is, however, admirably executed, even though not quite precise in the details of roads and villages. On the whole the most careful map of the Swiss part of the chain is that in Engelhardt's work;\* but the author has unfortunately adopted a complex and impracticable system of projection, partly picturesque, partly geometrical, which greatly diminishes its value. I cannot help thinking, also, that in this, as in other maps, the breadth of the Saasgraat is underrated at its upper part. It is a very pretty, though certainly not an easy topographical problem, to unravel the complications of this chain, of which the mountains are so inaccessible, so varying in their forms, and each called by several different names."

Now, it is not creditable to European geographers, that at a time when every day adds to our intimate knowledge of the Ural and Caucasus, of the Bolor-tag, the Altai, and the Himalaya, and of the mountain masses of America, such ignorance and confusion should prevail regarding the mountain mass which may be regarded as the central knot of the upheaving of the European continent; and which, at no great distance from Paris, London, and Berlin, has Vienna and Munich at its northern, Venice, Milan, and Turin at its southern, and Geneva at its western base. Much harm has been done in geography by the adoption of systems of classification and technical phraseology based upon mere topographical observation. But infinitely more mischief may be

\* "Schilderungen der höchsten Alpen," 1840.

the consequence of the vague and superficial notions which must result from exclusive attention to numerous hasty and necessarily superficial observations collected from all quarters. The contributions to geodetical science, from European travellers over the distant and colossal protuberances of the earth's surface which have been alluded to, can only be turned to account by him who has carefully studied those forms which are accessible to his own observation. It is in the Alpine regions of Europe that the European geographer must collect those preliminary notions, by the aid of which alone he can rightly understand and turn to account, in his department of natural history, the important facts gleaned by travellers in more remote regions. The account given by Professor Forbes of the wretchedly deficient knowledge of a portion of the European Alps so limited in extent, situated in such proximity to the principal resorts of European science as the Pennine chain, betrayed by the most recent maps, show that this maxim has been entirely disregarded; that the geographers of the present day are more intent upon accumulating materials than upon working them up into solid, consistent, and artistically finished systems. Yet it is only as materials for such systems that our accumulations of isolated facts, diffusely and verbosely expressed as they frequently are, can be of any value.

The statements of Professor Forbes respecting the geography of the Pennine chain supply a startling illustration of this truth. But they relate unfortunately to isolated cases of remissness in the attempts of European geographers to advance the knowledge of their own continent. Valuable materials have been accumulating for nearly half a century, and are still accumulating. Surveys of the principal European states, by skilful engineers, aided by the most recent and improved instruments, have been made or are in progress. The labours of De Luc, Saussure, Tralles, Humboldt, Von Buch, Struve, De Beaumont, and other distinguished scientific men, have gone far to prepare materials for a practical and comprehensive classification of the European local forms of the earth's surface. Yet no attempt has been made to extract from all these materials an improved geography of Europe. The surveys of each state, when they have been used by our map-makers, have been adopted, without any critical examination as to how far they were coherent with each other—whether the impossibility of bringing their *termini* to coincide did not imply errors in one or all. The discrepancies which exist in different parts of the same survey have not been adverted to. And our descriptive geographers have equally neglected to avail themselves of the observations of De Luc and Murchison, Saussure, Von Buch, and our author, with a view to improve their systematic accounts of European geography. The accumulation of materials confuses and



depresses rather than instructs, for the want of some one to select and arrange systematically what is essential in them. With such a storehouse of truths accessible, old errors are repeated, or mixed with truths picked up at random in a manner only calculated to increase confusion. The few who have attempted to improve European Geography have failed, from attempting to patch up old clothes with new cloth. The whole system must be remodelled: it is of no use to engraft a few isolated truths upon a system essentially erroneous.

We turn, from the considerations suggested, not expressly stated by our author, to pass in review his positive additions to our knowledge of the local forms of the European Alpine mountain mass, and their arrangement. In this part of our task we shall, as frequently as it is possible, allow him to speak for himself. His observations are confined to "that part of the Alpine chain called by the ancients the Pennine Alps, a term of doubtful origin, but which it is convenient to retain, as having no modern synonyme. It extends from the Col de Bonhomme, on the west side of Mont Blanc, to Monte Rosa inclusive, thus comprising the highest ground in Europe, and the two most colossal mountain groups." This is but a small portion of the great central elevation of Europe, which occupies the space bounded by the valley of the Po on one side, and the valleys of the Danube, Aar, and Rhone on the other. But to compensate for this Professor Forbes has gone over his ground repeatedly with perseverance, unremitting attention, and, above all, with the zeal which animates a man engaged in a labour of love.

"It is now," he says, "a good many years since I proposed to myself to travel, not as an amusement, but as a serious occupation, and with De Saussure before me as a model. I have reason to be glad that circumstances, by postponing its execution, led me to appreciate more fully the difficulties of the plan, and to come to its fulfilment, after some experience, with moderated views of ultimate success. The habit of observation, I have already observed, is of slow growth—to use opportunities we must prepare to seize them. I had the advantage of receiving my first impressions of Switzerland in early youth, and I have carefully refreshed and strengthened them by successive visits to almost every district of the Alps between Provence and Austria. I have crossed the principal chain of the Alps twenty-seven times, generally on foot, by twenty-three passes, and have of course intersected the lateral chains in very many directions. . . . I have spent a part of ten summers on the Continent, and six of these in the Alps and adjacent country. I have thus repeated my visits to the same spot, and, without almost any exception, I have found more to enjoy, to admire, and to learn on the renewal of my acquaintance with it. Most of the places described in this volume have been visited twice, and several of them in four different years."

It ought to be added, that the author's physical pursuits leading

him to determine repeatedly the elevation and geographical position of the places at which his observations and experiments were made, as also to take into account the most delicate and the most frequently recurring natural phenomena, as well as those adapted to arrest attention by their rare occurrence and striking character, were admirably calculated to engrave the express character of the country upon his memory and imagination. There is every reason, therefore, to believe that his descriptions of it are as accurate as they are vivid.

The region of which he gives an account, it has been already intimated, comprehends the Mont Blanc group to the W., and the group called Monte Rosa to the E. We shall first notice his descriptions of these two *termini*, and afterwards what he says of the intermediate chain.

Mont Blanc, and the mountain group of which it forms the centre, is, according to Professor Forbes, of an oval form. "In length this group extends from the Col du Bonhomme, on the confines of the Tarentaise, to the Mont Catogne, in the valley of St. Branchier, above Martigny, a distance of thirty English miles in a north-east and south-west direction; whilst its breadth, at right angles to the former, from Chamouni to Courmayeur, is only thirteen English miles." The natural limits of this group are defined with great precision. On the N.E. is the valley of the Drance, and on the S.W. the Col du Bonhomme. Along the base which fronts to the S.E., are the deep valley of the Allée Blanche, its continuation to the N.E., the Piedmontese Ferret, and the Swiss Ferret, separated from its namesake by the Col de Ferret. At the N.W. base are the valleys of the Arve and the upper valleys of its affluent, the Bon Nant, which joins it from the valley of Montjoie.

The S.E. side of the group is the more imposing in its appearance. We take Professor Forbes's description of it, as seen first from the S.E. and afterwards from the N.E. :—

"From the top of the Col de la Seigne,\* the extent of the Allée Blanche is well seen, with the great masses of the chain of Mont Blanc, which bounds it on the left. Mont Blanc itself presents a singular appearance in this direction, and would not be easily recognised by those who know it only in a northern and eastern direction. The western (?) and southern faces are very steep, although not so absolutely precipitous as they would appear to be when viewed in front. The former falls abruptly to the Glacier du Mingé; the latter in the direction of the Cramont, into the Allée Blanche itself. The bottom of the valley is here not more than 4000 feet above the sea; consequently this colossal mountain rises above it at a very short horizontal distance, and no less

\* The crest of this pass is 8422 feet above the sea: it connects the Mont Blanc group with the range which separates the head waters of the Po from the affluents of the Lower Rhone.

than 11,700 feet of vertical height, which, though not an unbroken precipice, is composed entirely of steep and savage rocks, upon which the snow cannot lie for any extent. Its aspect is, therefore, far more imminent and imposing than on the side of Chamouni, where the eye is greatly deceived as to the actual distance of the top, and consequently as to its height. But here the details rather aid the perspective, and, when seen in profile from the Col de la Seigne, the stupendous buttresses, by which the mountain is supported, and especially one prodigious aiguille of granite, called Mount Peteret, come out in relief, although, when a front view is taken from Courmayeur, or its neighbourhood, their pinnacles, thousands of feet in height, are lost against the towering mass behind, which there seems to rise like a wall. I am unable to state the exact line of junction of the limestone with the central mass of granite. I apprehend, however, that it runs from some way to the N. of the Col de la Seigne (which is calcareous) to the Cime des Fours, and so down nearly to Nantbourant, leaving the Aiguille du Glacier, and the greater part of Glacier de Trelatête, within the primitive boundary. To the E. the limit is in a good measure determined by the direction of the Allée Blanche, which separates for some distance the granite from the limestone. Two conspicuous summits, however, which appear near the foreground of the view, a little higher than the Col de la Seigne, are the Pyramides Calcaires de l'Allée Blanche of De Saussure. They are upon the left hand on descending. It is a walk of nearly five hours from the top of the Col to Courmayeur, during which we traverse the whole length of the Allée Blanche. It is there met by another parallel valley, which opens exactly opposite to it, and forms as it were the prolongation of the Allée Blanche for about five hours farther. This is called the Val Ferret, and terminates at the Col Ferret."

Let us now complete this picture by looking back at the S.E. side of Mont Blanc from the opposite termination of the prolonged Allée Blanche, and then casting a glance down the Swiss Val Ferret:—

"The view from the Col Ferret, looking back, is certainly one of the finest which I have seen. The prodigious outworks which sustain the mass of Mont Blanc on the southern side are more conspicuous here than from any other point, especially the Mont Péteret, which stands out like a majestic Gothic pinnacle. From hence, as from the Col de la Seigne, we see how far this side of the chain is from being an absolute precipice, as it appears when viewed in front as from the Cramont. The descent of the Swiss Val Ferret to Orsières offers no great interest, and is of most tedious length."

That part of the N.W. side of the Mont Blanc mountain group which rises from the valley of Chamouni, and the valleys of the confluent of the Bon Nant, present little that calls for especial notice in a brief *résumé* like the present. The Col de Bonhomme, at the S.W. termination of the group, connects it with high land prolonged nearly in the direction of its axis of greatest elevation, and forming a watershed between the Isère and the Rhone



immediately above its junction with that river. The high elevations of the group terminate here, and this accounts for the stormy character of the Col de Bonhomme, thus adverted to by Professor Forbes:—

“ The passage of the Bonhomme is one of the most dreary in the Alps; and in bad weather is dreaded by the guides. The strong west wind spends itself upon this great outline of the chain of Mont Blanc, and raises the snow into fearful eddies, called *tourments* in the French, and *guzen* in the German Alps, which are justly feared by those who are exposed to them. Here two English travellers lost their lives some years since. Their last entry is still to be found in the traveller's book at Nanthourant. I have crossed the Col de Bonhomme three times, and on one of these occasions, having merely a porter with me who did not know the way, we got bewildered in fog among the rocks, from which we were only extricated by my referring to the map and compass, instead of following the directions of my companion. When the summit is gained, a wide view is seen over the valley of the Tarentaise; and the traveller naturally thinks of descending immediately by a path right before him. Let him, however, beware of this, for it will lead him into the valley of Beaufort, which is most likely not his intended route. If going to Courmayeur, he follows an ill-traced path on his left, over black shale (or snow during part of the season), which conducts him nearly on a level, after a quarter of an hour's walk, to a point somewhat higher than the last, which is called La Croix du Bonhomme, and which on my last journey I found to be 8195 feet above the sea. The view from thence is striking, although Mont Blanc is concealed, the mountains of the Upper Isère, stretching away towards the Mont Cenis, are fully in view; and conspicuous among them is the Aiguille de la Vancise, a snow-clad pyramid between Montier and Lane-le-bourg, and which is undeniably one of the most elegant mountains in the Alps.”

From this tracing of the base of Mont Blanc it is evident that it ought to be considered as one independent mountain group. The high land which forms its prolongation S.W. of the Col de Bonhomme nowhere attains to the elevation of the central group, and terminates in the angle between the Isère and the Rhone. Mont Catogne, the N.E. termination of the group, has no connexion with any other group or range. With the range of which Mont Cenis forms a part Mont Blanc is connected by the Col de la Seigne; and with that of which the great St. Bernard forms a part by the Col Ferret: but the direction of its axis of greatest elevation does not coincide with either, nor do their axes of greatest elevation coincide with each other. All three are independent systems having only this in common, that they rise from and furrow the same great plateau, or protuberance of the earth's surface. The passes by which the mountain group of the Mont Blanc can be crossed are few and difficult:—

“ The Col du Géant offers the shortest passage from the Allée Blanche to the valley of Chamouni. It forms the crest of the chain, where the

western branch of the Mer de Glace takes its rise; and, notwithstanding its immense height, it would probably be frequented but for the dangers of the glacier on its northern side. A tradition, common to this and many other passes of the Alps, states, that formerly the glacier was less formidable, and that communication was not unfrequent between Chamouni and Courmayeur. This has not occurred, however, within some centuries from the present time. The passage of the Col du Géant appears to have been reckoned impracticable as late as 1781. M. Bourrit, writing in that year and speaking of the aspect of that branch of the Mer de Glace of Chamouni called the Glacier de Tacul, says with respect to the crevices:—"Elles sont si effroyables qu'elles font désespérer de retrouver jamais la route qui conduisait à la Val d'Aoste."\* De Saussure, in the second volume of his travels, speaking of the Glacier de Tacul, does not say one word of this historical passage of the Alps, though he seems to have thought it just possible that the summit of Mont Blanc might be gained in this direction;† and in the fourth volume, written some years later, when about to give an account of his memorable residence on the Col du Géant, he speaks of 'la route nouvellement découverte' from Chamouni to Courmayeur. This was in 1728.

"There is said to be a passage which has been effected from the Glacier du Miage, which penetrates very deeply indeed on the south side of the chain of Mont Blanc, to the valley of Contamines, by the glacier also bearing the name of Miage on the north side: but I have no accurate information of its accomplishment, and the appearance of the head of the glacier on the south side gives little encouragement to the attempt.

"One other passage of the chain has, however, been made, and that is by the glacier of Le Tour, near the Col de Balme, descending by the glacier of Saleva into the Val Ferret. This was discovered a few years since by a guide of Chamouni named Mounier.

"Such are the only known passes of this wild country."

The pass by the Col du Géant Professor Forbes accomplished in one day. He started from Courmayeur at  $\frac{1}{2}$  past 1 A.M., and reached Montanvert  $\frac{1}{4}$  before 4 P.M. His guides descended to Chamouni the same evening, "where their arrival created some astonishment, as no one had before crossed the Col du Géant in a single day, and as it was supposed that the fresh snow would have rendered the attempt impracticable." The observations made on this occasion on the Col du Géant gave the following results:—

—"whence the height of the Col du Géant above Geneva is 9803 feet,‡ above the sea 11,146, above Courmayeur 6979. The Col du Géant, by observations at the Montanvert on arriving there, is 4841 feet above that station. This result we shall afterwards find to agree with the direct comparison with Geneva, and hence we are disposed to place the Col du Géant at 11,146 feet above the level of the sea. De Saussure obtained it trigonometrically, by reference to Chamouni, using the Aiguille du Midi as an intermediate point seen from both, and taking the

\* BOURRIT, *Voyages*, i., 72.

† § 629.

‡ Calculated both by Baily's tables and those of the French *Annuaire*.

barometrical height of Chamouni, he determined for the Col du Géant 1747 toises, or 11,172 English feet. By his seventeen days' barometrical observations, compared with simultaneous ones at Chamouni, he obtained by the formula of Trembley, 16 toises less, reducing the height to 11,070 English feet. I have recalculated his simultaneous observations at the Col du Géant and at Geneva, and have obtained so low a result as 11,028 feet."

In addition to these investigations of the form and structure of the Mont Blanc group, Professor Forbes has executed a trigonometrical survey of a portion of the system of glaciers situated on its north-western declivity. The ground-plan of the glaciers surveyed is nearly a triangle. One side is formed by the crest of the group from the Col du Géant rising from the Allée Blanche, to the Montagne des E'boulements rising from the Val Ferret; the second passes a little to the E. of the summit of Mont Blanc down to the termination of the Glacier des Bois in the valley of Chamouni, and the third extends from that part to the Montagne des E'boulements. A list is given of the Glaciers on the N.W. side of the group, between the Glacier des Bois and the Col de Bonhomme, accompanied by brief descriptions. We have also accounts of excursions on the principal N.W. glaciers between the Glacier des Bois and Mont Catogne, illustrated in the case of the Glacier d'Argentière by an eye-sketch. Lastly, we have notices of the Glaciers on the S.E. side of the group, with eye-sketches of the more important. In short, we have scattered through this book materials for a much more complete monograph of the Mont Blanc than has ever yet been given to the public.

We pass on to Monte Rosa, the opposite extremity to Mont Blanc of the mountain regions traversed and described by Professor Forbes.

"The vexed question of the comparative height of Mont Blanc and Monte Rosa was undecided before the survey of Von Welden which was published in 1824. \* \* De Saussure measured not the highest peak, but the third in height now called the Zumsteinspitze. He made it 2430 toises, or 15,540 English feet above the sea.\* This was within 200 feet of the height of Mont Blanc; but later and more precise observations all agree in making even the highest point considerably lower. Von Welden finds it to be 14,222 French, or 15,158 English feet, which agrees nearly with the mean of the results of Carlini, Oriani, and Corabœuf.†

"Monte Rosa is a union of several mountain chains rather than one summit. The map, p. 1, though on a small scale, will give an idea of

\* *Payages*, § 2135.

† Carlini . . . . .	2348 toises.
Oriani . . . . .	2398 "
Von Welden . . . . .	2370 "
Corabœuf . . . . .	2379 "

Brugière, *Orographie de l'Europe*, p. 208.



their arrangement. From it, or from any map based upon Von Welden's, it will be seen, that a vast inaccessible ridge stretches nearly E. and W., commencing at the Col du Mont Cervin, between Zermatt and Breuil, and terminating in the Cime de la Pisse, to the east of Monte Rosa. This chain includes the Petit Mont Cervin, the Breithorn, and the Lyskamm. Another vast ridge, though a shorter one, meets this nearly at right angles, stretching from Monte Rosa northwards to the Cima di Jazi. It also crosses the chain to the S. so as to form the ridge of the Col d'Ollen, between the Val de Lys and Val Sesia. The union or *knot* formed by these two chains is the locality of the elevated summits properly called Monte Rosa. Of course four cavities or angles are left when the transverse chain meets the longitudinal one. The one of these to the north-eastward, which is the most precipitous, and which, indeed, has been compared by De Saussure to a crater, forms the head of the Val Anzasca, and embosoms the glacier of Macugnaga; the north-western one, vaster, but less precipitous, gives birth to the great glacier of Gorner or Zermatt; the south-western angle contains the glacier of Lys, which descends from the Lyskammi into the valley of Gressonay; the fourth, or south-eastern cavity, is occupied by the head of Val Sesia, and has also extensive though less prominent glaciers.

"Thus Monte Rosa is in ground-plan like a four-rayed star or cross. All the highest summits are ranged along the northern and southern rays, especially the former. The point of union of the rays is not the most elevated, though in some respects it is the most generally commanding top. It is the most conspicuous from the Italian side of the Alps; it has been called by Von Welden 'Signal Kuppe.' It is the fourth in point of height. The three higher lie all immediately north from it; the first in order is the Zumsteinspitze, the highest which has been ascended, which is a snowy blunt summit, mistaken by De Saussure for the highest. Next follows the highest, a sharp rocky obelisk, well seen from the Col d'Erin and from Monte Moro. It is connected with the Zumsteinspitze by a longitudinal very sharp icy ridge, like a house-roof, which on the eastern side descends with appalling rapidity to an abyss which is scarcely equalled for depth and steepness in the Alps. Beyond the highest, or 'Höchste Spitze,' is the second highest, called by Von Welden 'Nord-End,' which, like the last, has never been scaled. The difference of height of these four summits is trifling, amounting to only 34 toises, or little more than 200 feet from the highest to the lowest. Three other summits, of somewhat less height, form the southern arm of the Cross, namely the 'Parrot Spitze,' 'Ludwigs-höhe,' and 'Vincent-Pyramide,' the last of which, and also the lowest, was the first ascended of the group."

The Monte Rosa group, no more than that of Mont Blanc, stands on the axis of greatest elevation of the great protuberance of the Alps. Neither limb of the Cross forms a watershed. The stream which waters the Italian Val Anzasca has its sources on the N. side of the ridge that runs from E. and W. The valley of St. Nicholas and the valley of Saas, which lie E. and W. of the northern termination of the ridge, which runs from N. to S.,

unite at its termination in the valley of the Viège; and the valleys of Lys and Sesia, which in like manner lie W. and E. of its southern termination, converge in like manner. The Monte Rosa group, like that of Mont Blanc, is placed on one side of the axis of greatest elevation of Alpine protuberance. While, however, Mont Blanc is separated from the chain of heights that run along the axis of greatest elevation by the deep valleys of the two Ferrets and the Allée Blanche, Monte Rosa, from its central knot, throws out two branches at right angles to each other, which extend obliquely towards the axis of greatest elevation.

There are no practicable passes on the western, eastern, or southern limbs of the cross of Monte Rosa. And the accounts of a practicable though difficult pass across the northern one are rather problematical:—

“From the upper part of the glacier of Macugnaga,” says Mr. Forbes, “I crossed its main branch to the Châlets de Jazi, at the foot of the mountains of that name.” From thence the view of the precipitous amphitheatre of Monte Rosa and the Saasgrat is very fine. Nearly above those châlets I knew must be the celebrated pass of the Weiss Thor from Zermatt to Macugnaga. The Piedmontese shepherd who occupied the châlet could give me no information respecting it; and the range appears on this side so absolutely precipitous, that I could hardly convince myself that any track could be found accessible to human feet. It is certain, however, that occasionally precipices are more practicable than they appear at a distance, and generally less vertical; and, after a very careful examination, I detected a passage of the rocks, and only one, which it seemed possible to pursue. This pass is mentioned by almost every writer on Monte Rosa. De Saussure says that it is very dangerous, but does not say that he conversed with any who had performed it. In Hirzel and Von Welden I find no particular addition from personal knowledge. Engelhardt relates the account of a passage of the Weiss Thor by his guide at Zermatt, no doubt Damater, who has repeatedly assured me that he once passed it, and that it is very dangerous, much more so than the Col d’Erin. Schott states that this pass was formerly more used than at present, and almost exclusively for the purpose of pilgrimage from the Vallaia to the Monte Sacro al Varese; and this corresponds pretty nearly with what I heard from the host Vern at Macugnaga. It is pretty certain that it has been crossed but once in the memory of men now living, and then by a pretty numerous company. I believe that no one in the Val Anzusa has ever passed it.”

The axis of greatest elevation of the Alpine protuberance, in the part explored by Professor Forbes, appears to run among the mountain peaks from the great St. Bernard to the St. Gothard. A visit to the former is recorded in the volume now under review; the author gives no account of a nearer approach to the latter than in his passage across Monte Moro, from the valley

\* The Cima di Jazi appears to correspond with the Stralibühner, when seen from Zermatt.

of Anzasca to the valley of Sans. The passage of the Great St. Bernard is too familiar to require that we should dwell upon it. We shall, therefore, confine ourselves to Professor Forbes's notices of the less-known passes between the Great St. Bernard and Monte Moro. But before proceeding to the crest of the Alpine mass, a word about its declivities.

The Italian side of the declivity, it appears from our author's statement, is admirably executed in the government map of the Sardinian territories. It will, therefore, only be necessary to advert to the valleys on the Swiss side, intermediate between the Drancé and the Viège.

This group of valleys is situated between the Rhone and the great chain of the Alps; and their openings into the valley of the Rhone are so small and inconspicuous, that they are passed unnoticed by the traveller rolling along in his private carriage, or that of the Simplon courier, almost without perceiving their existence; yet opposite to three well-known stages on that road, Sion, Sierre, and Tourtemagne, three valleys proceed; the Val d'Érin or d'Herens (Eringer Thal), the Val d'Anniviers (Einfischthal), and the Vallée de Tourtemagne (Turtmanthal). Their magnitude and importance are in the order just stated. The Val d'Érin divides into two branches, the valley of Evolena and that of Héremence, both of which terminate in great glaciers, to wit, the glaciers of Ferpècle, Arolla, and Lenaret. The Val d'Anniviers divides into the Val de Torrent and the Val de Zinal, with glaciers of the same names. The valley of Tourtemagne is uninhabited except in summer, and terminates in a glacier at the foot of the Weisshorn.

"These valleys have not only been hitherto unfrequented by *tourists*, but are almost unknown even to *travellers* (to make a distinction commonly and not unjustly drawn in Switzerland). . . . Even at the time I am describing, although it was past the middle of August, the curé informed us that we were the only strangers who had yet appeared that season at Evolena. A pleasant little work by Fröbel, entitled '*Reise in die weniger bekannten Thäler auf der Nordseite der Penninischen Alpen*' (Berlin, 1840), has given the first and only detailed account of their worth notice; and even his visit was one of but a few days, and directed only to the most accessible points. His work is valuable from an improved map which it contains (upon which the index-map in this work is partly founded), and which corrects many of the almost incredible errors of the best executed maps before that time, such as those of Weiss, Keller, and Wörl. . . .

"It seems admitted by all who have mentioned these valleys, that their population is of a distinct race from their Swiss neighbours. . . . That they lived in a very independent manner, were heathens long after the conversion of their neighbours, became subject to the Bishop of Sion, and were Christianized by his missionaries, is confidently stated. . . .



"Their character does not appear to differ much from that of Valaisans, or indeed of the Swiss generally. Their hospitality, according to Fröbel, is seldom disinterested, and an intense love of money predominates in all their transactions. A dollar which once finds its way to Erin is never changed, and never comes forth again. . . . Their food is not only coarse, but scanty, and even unwholesome; their houses and apartments are among the worst in the Alps: cleanliness is not among their virtues. Much of this may be traced to laziness. . . . Mules are abundant for country uses, and no man will walk who can ride (even second) upon a mule; still less will any one carry even a common knapsack without complaint.

"The language is barbarous, but I doubt whether it is more so, or more distinctly national than in many other remote valleys of the Alps. . . . The name of Evolena is said to mean, in the native dialect, 'tepid water,' and may be derived from a number of beautiful springs which rise from the fallen débris at the foot of the mountain slope immediately behind the town. *Borgne*\* means brook; *biagno*, glacier; and *pigno*, mountain-top, which last Fröbel says is synonymous with the Spanish *penon*, the French *pignon*, and the Gaelic *bein*.

"These valleys, notwithstanding the seeming poverty of their inhabitants, annually export a great deal of produce. Evolena is eight hours distant from Sion. Its neighbourhood presents a very lively and fertile appearance, the valley being broad and well watered, covered with pasture, and studded with barns and chalets up to a great height on both sides; for, although the secondary ranges, which divide Erin from Hérémence and Anniviers, are of considerable height, and of a fatiguing nature to climb, as those who have passed testify, they are fertile and grassy, affording excellent pasture.

"Besides the natural entrances to these valleys from the valley of the Rhone, which, as we have said, are narrow and inconspicuous, there are various passes to and from the higher parts of those valleys. In former times the glaciers were, as we have also seen, undoubtedly much more accessible, and even the pass to Zermatt seems at one time, like the Col du Géant, to have been frequently used. From Hérémence there is said to exist a passage to the glacier of Chermontune, which may have been in the direction we saw in crossing the Col de Fenêtre. There is also a large pass, but not over ice, into the Val de Bagnes, below Mont Pleureur, which M. Studer crossed in 1841. From Anniviers it is very doubtful whether any glacier-pass exists; but from Tourtemagne, which is a valley inhabited only in summer, it is possible to cross the northern part of the Weisshorn, into the valley of St. Nicholas, above Staldon."

From the Great St. Bernard to the glacier of Allalein, in the valley of Saas, appears, from Professor Forbes's map, to be about 36 English miles in a direct horizontal line in the direction of E.N.E. This is nearly the direction of the axis of greatest elevation of this part of Alpine protuberance. East of the Great St. Bernard, and west of the glacier, five principal valleys furrow

\* Scottish, 'burn.'—Ed.

the N.W. declivity:—The Val de Bagnes, a bifurcation of the Drance valley; the Val d'Erin, with its side valley of Hérémence; the Val d'Anniviers, with its two upper valleys; the Vallée de Tourtemagne; and the valley of Visp, with its two upper valleys of St. Nicholas and Saas. The valleys on the S.E. side are the Val Pellina and the Val Tourmanche, affluents of the Doire, the Val d'AYas, Val Lys, Val Sesia, and Val Anzasca. The Val d'AYas, Val de Lys, and Val Sesia, descend from the S. side of the ridge of the Monte Rosa group that runs E. and W.: they have no connexion with the valleys on the opposite side by cols or passes. A col affords a passage across Monte Moro, from the upper valley of Anzasca, in the N.E. angle of the Monte Rosa cross, to the valley of Saas; and it is asserted that another col affords a passage from the upper Anzasca, across the N. limb of Monte Rosa, to Zermatt, in the valley of St. Nicholas. In the N.W. angle of the Monte Rosa cross is an immense accumulation of glaciers, from which it is said to be possible to pass E. to Macugnaga by the Weiss Thor, and W. to the upper valley of the Tourmanche, by the Col de St. Théodule. These glaciers descend to the valley of St. Nicholas, by the Glacier de Gorner and the Glacier de Finelen, and extend to the N. along the Saas-grat. To the N.W. of this accumulation of glaciers, and N.W. of the Great St. Bernard, the broad tract of the Pennine Alps is covered with a number of glaciers lying around the bases of the principal peaks, and communicating by cols with the upper valleys of both declivities. It is to Professor Forbes's adventurous excursions in this desert region that we are indebted for most of what is entirely new in his geographical information. The following retrospect will convey some idea of the disposition of the heights on this part of the ridge:—

“Before leaving this part of our description, I must say one word on the geography of this part of the chain. By Wörl's map, or that of Keller, until the edition of 1842, it would appear impossible that such a pass should exist as that which I am now describing [from Evolena to Zermatt.] The chain of the Alps is represented as turning from the Mont Cervin abruptly to the N.W.—as including the Dent Blanche, at the southern foot of which the Val Pelline is made to take its rise (?), and then as bending back again to the glacier of Arolla. Since the Dent Blanche is rightly placed between the glacier of Ferpècle and that of the Torrent-thal, it evidently would have been impossible to reach Zermatt from Evolena without crossing into Italy, and recrossing near Mont Cervin. Now, without detailing other varieties of error, the reality is, that the main chain of Alps is here well defined, and nearly straight, extending from Mont Cervin, through the Dent d'Erin, to the nameless summits south of Mont Colon, and at the true head of Val Pelline or Bionna. The whole north face of Mont Cervin and the Dent d'Erin is a united and inaccessible precipice, which falls into the glacier

of Zmutt, and which extends far to the westward of both, not rising (as even Fröbel inaccurately represents it) immediately behind the Mont Cervin, but in the great ice-mass to the westward of the Dent d'Erin. Now, just where the glacier of Zmutt takes its rise is the commencement of a great lateral chain, on so stupendous a scale as to create little surprise that it has often been mistaken for the great chain. The glacier of Ferpècle descends from its north-western flank, where it forms the Col d'Erin and the Stockhorn, upon which we conceive ourselves stationed. It then expands itself into the mass of the Dent Blanche, which sends forth the ramifications of the Dents d'Abriolla and Zatalane, which separate the valleys of Erin and Anniviers. From the Dent Blanche the chain takes an easterly direction, forming the summit called Moming in Erin, Tristenhorn at Zermatt (where the Dent Blanche is called Hovenghorn), which separates the valley of Zival and Zmutt. This part of the chain appeared to me quite impassable. Then follow a range of peaks called Gabelhörner, which continue the chain in a north-easterly direction, parallel to the valley of St. Nicholas, until we reach the culminating point of the Weisshorn, a seemingly inaccessible peak, of 14,812 English feet, which is often mistaken for Monte Rosa, especially from the pass of the Gemni, whence it and other parts of the chain just mentioned have been elaborately figured in Von Welden's work as the actual chain of Monte Rosa, and received specific names accordingly, although the real Monte Rosa is some thirty miles distant, and wholly concealed."

Some important hints are given respecting the structure of these mountains :—

"During this descent I had an opportunity of examining closely the structure of Mont Cervin, on the N.W. side, which probably no mineralogist has had before. There seems no reason to doubt that it is entirely composed of metamorphic secondary rocks. The lower part is of the system of *green slates*, which abound in this part of the Alps, and which here pass into serpentine and gabbro, as the moraines testify; the higher part of grey and *white slates*, remarkably contorted. The middle strata of Mont Cervin appear to form by their prolongation the Stockhi, on which I stood; and the Col d'Erin and Stockhorn are composed of a repetition of the green slate, which contains so much felspar that it may be called gneiss.

"The highest part of Monte Rosa, judging from specimens brought from the last accessible point, is mica-slate. The whole system of Monte Rosa, as already said, rises to the east, and the first regularly crystalline rocks we meet with are near the Pizzo Bianco, above Macugnaga. With respect to the age of these various rocks, few geologists are yet disposed to decide with much confidence. I have already discovered that the division between the true primitive gneiss and mica-slate, and the rocks of the same mineral character, which may be traced continuously into beds containing *lias fossils*, seems to be an arbitrary distinction, and one upon which no two observers could exactly agree. The age of the feldspathic and micaceous slaty rocks may be considered as



open to discussion. The others, namely the grey and green slates which I have described, are included by Mr. Studer in the general name of *Flysch*, a widely spread formation in Switzerland, but where superposition is too irregular and uncertain, and the series of formations too imperfect to afford any clue to its age, whilst the one or two fossils which have been found in it seem to point to an age newer than the lias, and older than the medium chalk formation. What an overturn of all ancient ideas in geology, to find a pinnacle of 15,000 feet high, sharp as a pyramid, and with perpendicular precipices of thousands of feet on every hand, to be a representative of the older chalk formation! and what a difficulty to conceive the nature of a convulsion (even with unlimited power) which could produce a configuration like the Mont Cerrin rising from the glacier of Zmutt."

It is to be hoped that, the ground having been fairly broken for an improved geography of the Alps, that region will not much longer be allowed to remain a reproach to modern geographical knowledge. It would have been pleasing to anticipate that the author of the work we have been reviewing might have been able to carry on the researches he has so admirably begun, but of this it is with deep regret we learn there is no immediate prospect. He is at present in such a delicate state of health—owing in great part, there is reason to apprehend, to his exertions and exposure in the inclement regions of the Alps—as to have been obliged to seek a milder climate than his native island affords, and to intermit the discharge of his professional duties during the present winter. May the change prove beneficial! and be the means of restoring to his favourite pursuits one who, with ardent zeal in the pursuit of knowledge, combines high qualities for attaining it and a rare degree of amiability, purity, and elevation of character.

II.—*Researches in Asia Minor, Pontus, and Armenia; with some account of their Antiquities and Geology.* By WILLIAM J. HAMILTON, Secretary to the Geological Society. London. Murray, 1842. [By the Editor.]

AMONG the geographical works entitled by their intrinsic merit to analysis, now lying on our table, Mr. Hamilton's appears to be classed most naturally with the other two selected for notice in the present Part of the Journal. Taken together, the whole three give evidence of a promising spirit of enterprise among the geographers of Great Britain, combined in two of the instances, in a rare degree, with judicious pains-taking. The circumstances attendant on the publication of Mr. Johnston's Atlas indicate an awakening interest in geographical research in a

seat of scientific inquiry where it has been hitherto comparatively neglected. The work of Professor Forbes—also emanating from the scientific circle of Edinburgh—is an example of a mind at once highly gifted and perseveringly industrious, devoting itself to show how much may be done to elucidate truth by observation in what are too commonly deemed hackneyed and exhausted spheres. Perhaps, there can be no better indication of a high caste intellect than this faculty of seeing in all the freshness of first impressions those objects to which more common-place minds are blunted by familiarity. Mr. Hamilton, on the other hand, carries accomplishments and natural abilities quite on a par with those of Professor Forbes into distant regions, and pursues his observations with equally unremitting accuracy. It is only thus that geography, or any branch of knowledge, can be promoted. The poet may work alone—not with the same success as when he catches suggestions and emulative energy from rivals in the same path,—but his materials are within his own breast; a poem is the work of an individual mind. The scientific inquirer, on the contrary, can only work in combination with many. The collective store of the observations of many individuals in many generations,—the forcing of opinion into the medium path of truth by the antagonism of minds liable to errors of an opposite kind,—are required to form a science. With geography in particular this holds good. The adventurer in remote regions,—the less ambitious traveller who can find novelty in the beaten track,—the closet speculator,—all their peculiar talents and exertions must be combined to make geography what it ought to be. And it is of good augury for its progress in our own country at the present time that we find widely different talents and tastes industriously promoting it under the guidance of sound judgment.

With regard to Mr. Hamilton's '*Researches*' we feel inclined to repeat a sentiment similar to that already expressed with regard to the work of Professor Forbes, that we almost value them less for the additions they make to our positive knowledge, than as a model of the manner in which travellers ought to conduct their observations. It has always appeared to us a noble idea of Milton, in his '*Tractate on Education*,' when he proposes that the young men of that class whose especial task he considered government to be, should, at a certain age, be sent to travel, obliged at their return to report the results of their observations to the Council of State, and employed and promoted in proportion as they appeared to have turned the opportunities and experience of their travel to good account. In modern times the press has become a very efficient substitute for the arrangement proposed by Milton, and has enabled our young travellers ambitious of a useful and dis-

tinguished career, to prove their capacity for public service, thus benefiting at the same time science and themselves. Whoever has materials for a book may make a book, and he who has a more scanty store may find work for it in the scientific journals. To travel, and to publish, in some form or other, the results of travel, has become a taste and almost a habit in the present age. The result is, to borrow an illustration from Shakspeare, among much chaff some grains of wheat. And it is with a view to elicit the greatest possible benefit from such a fashion (the word is used in no fastidious sense), that we would recommend to all who may aspire to tread in the footsteps of Mr. Hamilton, to emulate also his careful preparation, and the unrelaxing activity with which he kept the objects of his travel before him throughout.

"In the early part of 1835," says Mr. Hamilton in his preface, "I was induced to direct my attention to some of the Turkish provinces in Asia, which could not fail to present discoveries interesting to the antiquary, the geographer, and the geologist. I accordingly arranged a plan which, at the same time, promised to gratify my love of travel and to rekindle those classic associations which are connected with our early habits. The following three or four months were passed in preparing for the task, in examining the ancient writers, and in acquiring the use of the sextant and circle.

"My attention was directed chiefly to the comparative geography of the country, the examination of ancient ruins, and the fixing of positions by astronomical observations. The geology of the country also claimed a large portion of my time; and, considering the difficulty of transport I had to encounter, I may deem myself fortunate in having made a large collection of rocks and minerals. I soon found that the maps of the country were incorrect in the highest degree; in fact absolutely useless. I therefore spared neither time nor labour in making a careful annotation of time, distance, and directions, by which means, together with astronomical observations for latitude, I hoped to be able to construct a more correct map of those parts of the peninsula through which I passed. With this object in view, and independently of a very detailed journal, I succeeded in keeping, with a very few exceptions, a minute itinerary of every mile of road, noting the exact time of departure, and with my compass constantly in hand, the direction of the road, as well as every change, sometimes to the number of twenty or twenty-five in an hour; adding remarks suggested by the physical structure of the country. A specimen of this itinerary, representing one day's work, will be found in the Appendix.

"In order to construct a map, after my return to England, the whole of the route, extending over several thousand miles of road, was laid down on the scale of one inch to a mile; in this task I received much assistance from Captain G. H. Hamilton. The neighbouring country was then marked in from my geographical notes and cross-bearings; after which it was corrected for the observations of latitude (worked out by the same officer), and then reduced by him to the scale of five miles to



an inch. In this state it was put into the hands of Mr. John Arrow-smith, whom I cannot sufficiently thank for the manner in which he has executed his part of the labour. I may add, that in those parts of the country through which I passed all the positions have been laid down from my own observations, with the exception of the lines of coast which have been taken from the naval surveys, and a portion of that of the Euxine from Mr. Ainsworth's map. In other parts of the country I have introduced the routes of Messrs. Ainsworth, Fellows, Brant, and others, whose observations seemed entitled to credit; amongst which Colonel Chesney's delineation of the country round the Gulf of Scanderoon and the Syrian passes, together with the neighbouring mountains, is one of the most important. For the western shores of Asia Minor I am indebted to Captain Beaufort, who has kindly placed at my disposal the excellent charts constructed by the officers employed on the surveys carried on by Captains Copeland and Graves."

This, we repeat, is the spirit in which a traveller who would render his labours useful to others and to himself must set to work and carry out his enterprise. The three or four months of preparation to which Mr. Hamilton alludes may appear inadequate, and so it would be to those who did not bring to the task talents developed like his by an excellent education and habitual interest in literary and scientific pursuits. What Mr. Hamilton calls preparation was properly reviving knowledge and faculties previously acquired, but allowed in the hurry of other avocations to rust a little. We may add that it is comparatively easy to sketch out such a plan of travel as his before-hand, and even to speak of it complacently afterwards as having been carried into effect. But the specimen of the itinerary referred to in the above quotation is a curious piece of evidence to the unflagging spirit with which our traveller's resolutions were acted upon throughout a protracted journey of seventeen months. It is the power evidenced by this document of sustaining day after day the monotonous detailed labour of a self-imposed task that enables men to accomplish anything of value. Mr. Hamilton has given only one day's work as a specimen, and a small part even of that will serve our purpose. It is to be wished, however, that the itinerary itself may have been preserved, and that it should be deposited for reference in the archives of the Royal Geographical Society.\*

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\* Other MSS. of the same kind, which would only prove tedious to the mass of readers, and which consequently never can be published, might be deposited for the like purpose with great advantage to geographical science. For example, the portions of Bruce's note-books published by his biographer, Dr. Murray, have been of great use in correcting the lapses of that great sample of the *perfidarum ingenium Scottorum*, into which he allowed himself to fall by his intractable pride and irritable disposition. But much remains unpublished that might be studied with advantage by geographers. Were they entrusted for reference to some such public depot as the archives of the Society, they would be always available.

Thursday, May 25th, 1837.		
N. 20.	S.S.E.	Start through Mondaniash.
7 20	S.W.	Ascending through Turkish town.
25	W.	
26	W.S.W.	Clear of town.
28	S.S.W.	Ascending ridge, ground slopes <i>r</i> and <i>l</i> : olives and vines.
31		Winding up steep road.
33	S.W.	Ascending ridge; ground slopes <i>l</i> .
36	W. by S.	Halt two minutes; ground slopes to sea, one mile off.
40	S.W.	
47	W.S.W.	Halt two minutes.
50	W. by W.	
58	W.S.W.	
S. 1		
	&c.	&c. &c.

The scene of Mr. Hamilton's operations in Asia Minor lies between the parallels  $37^{\circ}$  and  $42^{\circ}$  N., and between the meridians  $27^{\circ}$  and  $44^{\circ}$  E. of Greenwich. The extreme *termini* of his expeditions are, on the W., Smyrna to the N. and Ephesus to the S.; on the E., the Turkish frontier opposite to the Russian fortress Gümri (*circa*  $44^{\circ}$  E.) on the N., and Kaisariyeh (*circa*  $35\frac{1}{2}^{\circ}$  E.) on the S. Between these extreme points his southern route extends as far S. as Karaman (a little to the N. of  $37^{\circ}$  N.); and his northern route as far north as Sinope (*circa*  $42^{\circ}$  N.). From Niksar on the Yeshil-Irmak to Smyrna, and from Kaisariyeh to Ephesus Mr. Hamilton's two principal routes wind through the very heart of Asia Minor. The northern route is connected between the 28th and 29th meridians E. of Greenwich with the shores of the sea of Marmora by a very interesting side route. From Niksar (*circa*  $37^{\circ}$  E.) to Sinope (*circa*  $35^{\circ}$  E.) the northern route curves back upon itself in a N.W. direction towards the sea; it extends thence along the sea-coast to Trebizond,\* whence it strikes inland to Gumishkaneh, and thence E. to Arzrum, Kars, and Gümri.

The Itinerary of which a fragment has been quoted above is warrant that Mr. Hamilton did not go over all this ground with listless or inattentive eye. Nor did he confine his observations to those of a mere flying survey. It appears from the account of his method of procedure, which has already been quoted, that he made a large collection of minerals, and the remarks on geology scattered through his work denote an intelligent geologist. The observations for latitude by Mr. Hamilton, that have been calculated by his brother, are sixty-one in number; and during his travels in Asia Minor he collected no less than 455 Greek inscriptions—some of them of considerable length and great importance. This brief recapitulation of the extent of ground gone over, and of the

\* This is reversing the direction in which Mr. H. travelled; but our object at present is merely to indicate the extent and relative position of the ground gone over.

numerous and important observations collected in the course of the expedition, will suffice to show the rich harvest, both for positive and comparative geography, contained in Mr. Hamilton's volumes. His routes occasionally cross those of other travellers, but rarely coincide with them, and even when they do, only for very short distances. His field of operations connects the surveys of Captains Copeland and Graves, on the W., with those of the Russian officers, and the routes of Mr. Brant on the E. It is crossed by the routes of Mr. Ainsworth, which connect it with the operations of Colonel Chesney's expedition on the Euphrates. We have only to regret, and where so much has been accomplished by one unaided individual the omission is as nothing to what has been done, that Mr. Hamilton, when at Karaman, did not make a side excursion to the S. coast of Asia Minor, and thereby connect his routes with Captain Beaufort's marine survey.

The limited range—the almost topographical character—of Professor Forbes's corrections of Alpine geography enabled us to enter upon them with a degree of detail, which, with a work grasping so extensive a field as Mr. Hamilton's, is clearly impossible. To indicate his corrections of the geography, positive and comparative, of Asia Minor would require a volume. Indeed, considering how much has been done by Messrs. Hamilton, Ainsworth, Arundel, the British officers engaged in the coast-survey of Asia Minor, Mr. Brant and others, and by the alterations which have taken place in the provincial arrangements of the Turkish empire, since the publication of Colonel Leake's work, which first gave form and system to the geography of this peninsula, it is much to be desired that some one would undertake the task. Should Colonel Leake feel disposed to undertake it, the domain is in a manner his own; he has the best right. But should he decline, there appears to be no one so well fitted for the task, by opportunities of personal observation and by collateral knowledge, as Mr. Hamilton himself. Mr. Arrowsmith's map, which accompanies this work, and of which Mr. Hamilton speaks in such high terms—and they are not higher than it deserves—might form the groundwork of such a memoir. Mr. Arrowsmith has judiciously left blank in this map all the spaces not visited by Mr. Hamilton, or the authorities he has enumerated. But, even during the short time that has elapsed since the publication of the map, valuable materials have accumulated for rendering it more complete:—the surveys of the Prussian officers serving with the Turkish army, and the protracted routes of private travellers. Mr. Arrowsmith will soon have it in his power to render this map much more complete; and its value would, in that case, be greatly enhanced by a memoir containing a systematic view of the physical and political geography of Asia Minor—all its existing divisions and subdivi-



sions, with the native names; and, added to this, a view of its comparative geography, in which all the additions made to our knowledge since the publication of Colonel Leake's work should be turned to account.

The sentiment most forcibly impressed upon us by the perusal of Mr. Hamilton's researches is our utter ignorance of the ancient history of the region through which he is travelling. The artistical perfection of the classical writers leads us to over-estimate the amount of positive information they contain. In reading Homer, Herodotus, Xenophon, Cicero, and even Strabo, Arrian, and Quintus Curtius, the mind is so occupied that we forget that they merely skirt the coast, or hurry by beaten tracks across the country, throwing out few hints of its appearance or history. The notices of Asia Minor that may be gleaned from the fathers, or from the contemporary profane writers, are scarcely more rich. But it is only when we are conducted by an intelligent traveller, like Mr. Hamilton, through the valleys and ravines which channel its huge plateau, that the meagre character of their information strikes us. A citation may serve to make our meaning more clear: the remains described are in the S.W. corner of the drainage basin of the Yeshil Irmak.

"While meditating on my disappointment, and on the probable origin of the ruins around me, Hafiz Agha reported that he had learned from some peasants that, in the neighbouring village of Euyuk, about two miles off to the S.S.W. there were some curious old stones, in search of which I immediately started. On arriving there I found a Turcoman village, on the southern limits of which was a very curious monument of the oldest times. When I first saw the numerous rude and apparently shapeless stones, forming a kind of avenue, they reminded me of Druidical remains, and I thought they might have belonged to the Gallo-Græci; but, on further examination, they proved to be of a different character. The ruins consist of a large gateway or entrance, facing the south, with part of a massive wall on each side; the two principal stones which form the posts are of gigantic size, being 10 or 12 feet high. On the outside of each is sculptured a monstrous figure with a human head, in a very Egyptian style, the body being a grotesque imitation of a bird, the legs of which terminate in lions' claws. The wall, which advances about 14 feet on each side of the gateway and then breaks off to the right and left, leaving a paved inclosed space in front of the entrance, has consisted of enormous blocks of Cyclopean character, but is now much ruined; yet, on the lower course of stones, which are above 3 feet high, several figures, nearly of the same height, are rudely sculptured in very flat relief. The first stone, towards the west, represents children playing upon instruments, but too faint to be distinguished; the second represents three priests clothed in long robes; the third rams driven to the sacrifice; and the last a bull, very rudely sculptured. Within the gateway an avenue of large stones leads some distance into the village. A curious feature of this monument is, that on the

inside of one of the high door-posts a double-headed eagle has been sculptured, which, however, may have been a modern addition. In front of one of the cottages in the village was a large square stone, with an inscription in very curious characters.—Are they Phœnician or Phrygian, Greek or Celtic? These remains acquire additional interest from the curious carvings which Texier discovered on the rocks near Boghaz-kieu, only five hours from the village."

The literature of antiquity may be searched in vain for the history of these and other equally mysterious remains upon which recent travellers in Asia Minor have stumbled in valleys and ravines. The history and geography of ancient Asia Minor, both of which are necessary to the perfect understanding of either, have yet to be composed. Materials—scanty enough, and which have yet to be assorted and subjected to a searching *critique*—do exist in the inscriptions to which Mr. Hamilton has added so many, and in the legal compilations of Justinian and the other emperors. These, if properly studied, by the lights thrown on them from ancient history and ancient itineraries, and which they reflect back upon these sources, might be found to yield more valuable results than will readily be believed by those who are not aware how much has been accomplished within the last quarter of a century by an analogous process for the ancient constitutional and legal history of Rome. The ecclesiastical historians and Greek fathers may also be studied with advantage to this end. But they must be *studied*. Not much is to be done for comparative geography by the *dilettante* fashion in which it is too generally pursued. A respectable and intelligent traveller who has passed through regions rarely visited in which some remarkable historical incidents are believed to have occurred, sets himself, on his return, to read up, with a view to fix the exact locality of these events. In proportion to his want of acquaintance with such inquiries is the confidence with which he maintains his conclusions. If he is ignorant of the original languages he is sure to be particularly elaborate in his learning. He asks no credit for a simple and truthful description of what he has seen or measured; for that nothing is wanted but the exercise of faculties which he, a shrewd and veracious man, employs every day. But learning is something so unfamiliar to him—has such a gloss of novelty about it—that he becomes enamoured of himself in his new dress. He thinks nothing of what he might really earn credit by—seeing and describing accurately,—and he prides himself upon a worthless parade of what he thinks is learning. To be rendered available for the purposes of comparative geography the ancient authors must have been studied thoroughly before-hand and for themselves. If a man only turns to an isolated passage for the purpose of bolstering up a preconceived theory, he may almost be certain that he will misunderstand it.

In enumerating the ecclesiastical writers among those who may be consulted with advantage, for the ancient history and comparative geography of Asia Minor, it is not meant to be implied that the monument, the description of which suggested this digression, was contemporary with them. At the same time, we are not inclined to believe that it, or others of a kindred character in Asia Minor, are necessarily of a very remote era. Many of the rock carvings of Persia were contemporaneous with the Roman empire. The military operations and colonies of that state transplanted superstitions from their native soil to the most remote regions. Isis had temples reared at Rome, and Mithra was sculptured on the rocks of Gaul. The allegorical paganism of the Alexandrian school, and the wild heresies of some of the Gnostic sects, favoured the amalgamation of the most heterogeneous god-notions and forms of worship. The Confessions of St. Augustine show that, even so late as his time, the popular mind was in many places essentially pagan. This was an age of very low artistic taste and talent; and lubberly shapelessness is as much, if not more, a characteristic of retrograding than of infant art. The figures described in the passage quoted above, in so far as we can judge of them from the accompanying drawing, appear to us to have more analogy to the figures on the gnostic medals or talismans than to the early sculptures of Egypt. Nor are the Cyclopean blocks stumbling-blocks in the way of this conjecture: the huge stones of Balbek were quarried under the Roman emperors. This, however, is a mere conjectural hint, thrown out to suggest examination in a certain quarter. As suggestive of inquiry all conjectures are valuable; for any thing beyond this the most plausible conjectures have no value at all.

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III.—*The National Atlas of Historical, Commercial, and Political Geography, constructed from the most recent and authentic sources.* By ALEXANDER KEITH JOHNSTON, F. R. G. S., Geographer (at Edinburgh) in Ordinary to Her Majesty. Accompanied by Maps and Illustrations of the Physical Geography of the Globe, by Dr. Heinrich Berghaus, Professor of Geography, Berlin; and an Ethnographic Map of Europe, by Dr. Gustaf Kohnst; Edinburgh, 1843. [By the Editor.]

THE feature of this new atlas which first arrested our attention was the physical geography of Professor Berghaus. This part of the work consists of that distinguished geographer's map-illustrations of Humboldt's system of isothermal curves, of the geographical distributions of the currents of air, of a survey of the culture of plants, and of the mountain-chains of Europe and



Asia. The map-illustrations are accompanied by explanatory memoirs. Of the execution of these maps by Mr. Johnston, Professor Berghaus, an eminent authority and not unlikely to be somewhat *exigeant* from anxiety to see justice done to his own ideas, says: "I now submit to the friends of geography in Britain four sheets of my physical geography, which differ from those of the German edition, in being much larger and more complete." This is high praise and from a quarter whence praise is desirable. Professor Berghaus intimates a disposition, should this specimen of his geographical labours meet with a favourable reception in this country, to continue the undertaking in conjunction with Mr. Johnston. Of the German edition, fifty maps have already been published. It would be creditable to the country were this hint acted upon and a complete English edition of the work called for.

There is much truth in the remark of Baron von Humboldt which Professor Berghaus has chosen for a motto to his physical geography: "*C'est le grand avantage des méthodes graphiques appliquées aux différens objets de la philosophie naturelle, de porter dans l'esprit cette conviction intime qui accompagne toujours les notions que nous recevons immédiatement par les sens.*" It is desirable, it is true, that any over-estimate of this advantage should be avoided. The "*conviction intime*" which is conveyed to the mind by the inspection of graphic representations of the theories of natural history and geography is valuable, because it is more precise and definite than can be conveyed by words. But there is danger that the "*conviction intime*" may become belief in the accuracy of such representations without a very critical examination of the evidence by which they are supported. Even the most cautious thinkers are, at times, apt to confound vivid ideas with accurate ideas. It is owing to this tendency of the mind that systems in which imperfectly apprehended truths are mixed up with much incoherence, but which are presented in a picturesque form, as, for example, phrenology and physiognomy, have obtained at times a success not altogether of ephemeral duration. Description in words has this disadvantage, that the writer or speaker's meaning is more liable to be misapprehended. Words are to a certain extent arbitrary representations of thought; every man has his own modification of the ideas attached to them; they call up in his mind notions and trains of thought rather analogous to than identical with those of the person who uses them in the first instance. But a graphic representation, at least as far as forms go, appears the same to all. On the other hand, words do not deceive, as graphic representations are apt to do (at least not to the same extent), by substituting themselves insensibly for the thing represented, and being received in a manner as evidence

of their own truth. In the use of graphic representations, therefore, to express geographical theories, whether regarding the distribution of magnetic forces, isothermal lines, currents of air, or the like, care must be taken to keep constantly in mind that they are not representations of actual facts, but simply of the delineator's inductions,—of his peculiar way of viewing facts. With this caution their utility to science can scarcely be too highly estimated. They give assurance to the propounder of a system that he cannot be misunderstood; and by subjecting him to such a definite method of expressing his ideas, they deter him from obtruding on the world crude, incoherent, half-elaborated theories. They introduce something of the severity of mathematical demonstration into the sciences of experiment and observation.

There is another point of view which suggests caution in the use of map-illustrations of physical theories. The ordinary map itself is not an exact transcript or fac-simile of the earth's surface as it really exists. The mathematical projection necessarily introduces something conventional into its composition; places are represented not in their actual relative position, but in a manner that is understood to indicate that position. With every step made in the graphic delineation of objects, or facts less and less palpable to sense—from the mere surface of the earth to the juxta-position of its mountain-rocks, thence to the distribution of its vegetable products, its isothermal lines, and so on,—what is real in the representation diminishes, and what is conventional increases. In aiming at too much the possible is undervalued; a slovenly style of simple map-making is liable to creep in when the invention of geographers is strained to devise map-illustrations of physical theories. These applications of the map must always be kept in due subordination to the prosaic common-place business of representing localities, their relative positions, latitudes, and longitudes. Graphic illustrations are only valuable so long as they rest upon the basis of good simple maps. Good simple maps are necessities; map-illustrations are, after all, in some measure, the luxuries of science. It is not unnecessary to enforce this truism, for we have seen ingenious and showy map-illustrations, the construction of which, when examined strictly as maps, would have disgraced a school-boy. And it is precisely when adverting to the physical map-illustrations of Berghaus, that this topic can be introduced without any danger of incurring suspicion that it is done invidiously; for it is difficult to say whether in him the faculties which go to make the accurate critical map-constructor, or those more elevated faculties which go to make the bold yet sagacious physical theorist, are most happily developed. The simple maps of Professor Berghaus are quite as admirable specimens of their class as his map-illustrations of physical theories.

A happier selection could scarcely have been made within so small a compass for illustrating the peculiar merits and utility of Berghaus's great work than that of Mr. Johnston. There is an intimate relation between the isothermal curves and the local prevalence of certain currents of air. Of the fixed features of the globe none seem to bear so directly upon these undulating or varying features as the distribution and arrangement of its mountain chains. And the distribution of vegetable forms is in no slight degree determined by the soil from which they spring, the exposure dependent upon the direction of the inclined planes on which they grow, the local distribution of heat, and the prevailing local currents of the atmosphere. These four map-illustrations, with the memoirs which accompany them, embrace a very considerable part of the whole physical theory of the earth. They embody the most recent discoveries and consequent rectifications of the theory of the earth. They are an invaluable addition to an atlas meant for popular use.

Dr. Kombst's map and notes on the ethnography of Europe display extensive and minute inquiry combined with considerable critical power and a high talent for classification.

Of the maps of general geography in Mr. Johnston's Atlas it is not so easy to speak without, on the one hand, falling into an enumeration of dry and repulsive minutiae, or, on the other, adopting a brevity calculated to mislead. The maps, as is unavoidable in so large a collection, are of unequal value. Those of Scotland and France are, perhaps, the best, while that of Nubia and Abyssinia leaves most to wish for. Much may be done to eliminate casual errors by corrections in successive impressions. It would be unjust to Mr. Johnston to insert here a list of the errors to which we allude. The effect of such a procedure would be to bring out in microscopic detail every blemish, at the same time that all that is good is necessarily kept out of sight. Enough that we know his attention has already been drawn to them; and that the generous ambition to distinguish himself as a geographer evinced by this publication, which may be considered as his *coup d'essai*, gives warrant that they will not be disregarded. Two of the maps occur to us as proofs, at the same time, of exertion to procure information and judicious caution in using it—the maps of Greece and Spain. The recent changes in the political geography of these countries are given by Mr. Johnston for the first time in a British atlas. But with great judgment, while he has introduced the new governmental divisions on the map of Greece, of which kingdom we have recent and valuable surveys, he has indicated those of Spain in a skeleton map on a small scale on the same sheet with the detailed one, that country being still one of the lacunæ of



European geography. Mr. Johnston, it is to be hoped, will keep the sound judgment indicated by these facts as his guide in all future improvements of his maps; for at a time when geography is making such rapid advances, not a single new impression ought to be taken of any map without revision. It is a remark of universal application that the great sources of defects in maps are, first, the apathetic indolence which is not on the alert to seize every new piece of information; second, the uncritical spirit which jumps at the conclusion that the most recent accounts are always the most correct, and dovetails the statements of the latest traveller into old maps without inquiring into the evidence in support of the novelty, or how far the old and the new cohere.

There is this additional cause of gratification in the appearance of Mr. Johnston's Atlas: it indicates (we learn from his preface that some of the most eminent scientific characters of Scotland have taken an active interest in its progress) an increased attention to this department of knowledge in the "modern Athens." In physical research the capital of Scotland is behind no capital in Europe, but geography has hitherto been sadly neglected there. We hope that this atlas may be taken as a symptom that what the Huttons, Playfairs, Blacks, Leslies, and Jamesons have accomplished in other branches of physical inquiry will now be emulated there in geography. The situation is less favourable for the promotion of general geography than London or Paris, or, perhaps, St. Petersburg; but for the more recondite (and more valuable) labours of scientific geography its opportunities may be rendered quite equal to those of Berlin. It is for this reason that we wish to see the conjoint labours of Professor Berghaus and Mr. Johnston prosecuted further. Let us have a British edition of Berghaus's *Physical Geography*. Such a work would be a worthy supplement to the "Preliminary Dissertations" of the "*Encyclopædia Britannica*," not the least important of Edinburgh's contributions to science.

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## MISCELLANEOUS.

1.—*Expeditions of Discovery in South Australia.* By EDWARD JOHN EYRE, Esq.

UNDER any circumstances, expeditions which have contributed so much to extend our knowledge of the southern regions of the Australian continent, as those performed by Mr. John Eyre, in the years 1839-40-41, would have called for notice in the 'Journal' of the Geographical Society. The propriety of giving an account of them has become a necessity, since one of the gold medals placed at the Society's disposal has been awarded to him.

Mr. Eyre's connexion with the colony of Southern Australia commenced towards the close of 1837, with an undertaking characterised by the same spirit of adventurous hardihood that has enabled him to accomplish so much as a discoverer with comparatively limited resources. The practicability of driving cattle overland westward from New South Wales to Adelaide was at that time considered extremely problematical in Sydney, and few were willing to be the first to risk their property on such an adventure. More daring spirits, however, were willing to take the field, and, amongst others, Mr. Eyre and Messrs. Hawdon and Bonney. Mr. Eyre was the first to start, although the other two gentlemen, owing to the delays he encountered on the road, were the first to reach Adelaide. Mr. Eyre left Sydney with his party on the 8th of November, 1837. He diverged to the S. of the Murray, hoping to strike upon a more direct practicable route to Adelaide; but the country into which he had advanced proving sterile in the extreme, and devoid of water, he was obliged, when within 200 miles of his destination, to retrace his steps to where he quitted the river. Owing to this detention he did not reach Adelaide till the 13th of July, 1838. During this journey of eight months, in part through desert tracts, in part along the courses of rivers, which for Australia are thickly peopled and with warlike tribes, he, with his small party of six men, conducted in safety a herd of 300 cattle and three drays. The delay, therefore, to which his ambition to strike out a new path exposed Mr. Eyre, enabled him on the other hand to prove his possession of the

tact and management so indispensable in the leader of an expedition of discovery.

On the 5th of December, 1838, Mr. Eyre again left New South Wales with 1000 sheep and 600 cattle, and arrived safely in Adelaide on the 23rd of February, 1839. This time he accomplished the journey in a much shorter period, having been less than three months on the road. The vague expressions of the documents from which we derive our information do not enable us to determine whether the interval consumed on this expedition is calculated from the time of his leaving Sydney, or from the time of his leaving the settled districts of the colony of New South Wales. Be that as it may, to Mr. Eyre belongs the honour—without any derogation from the high merits of Messrs. Hawdon and Bonney—of having been the first to undertake, and one of the most persevering in thoroughly opening, the road for the thousands of sheep and cattle which have since been driven overland from Sydney to South Australia, so much to the benefit of the latter colony.

Before quitting this preliminary matter to dwell upon our proper theme—Mr. Eyre's exploits as a discoverer—it may not be altogether irrelevant to notice his successful efforts to extend still further that branch of commerce which he had been mainly instrumental in establishing. On the 30th of January he left Adelaide to open a communication between that settlement and Western Australia by water, for the exportation of sheep. Upon landing his flock at King George's Sound, he undertook a further overland journey with them to Swan River, a distance of 320 miles. Since that time the trade in stock between the colonies of South and Western Australia has continued steadily to increase.

These incidents in the life of Mr. Eyre do not seem to us out of place here. They illustrate the character of the man—explain in some measure how he has been able to accomplish what he has already achieved—and lead us to hope that the material interests of his adopted country, and geographical science, will be yet further benefited by the exertions of so resolute and enterprising a spirit.

During the course of the year 1839, Mr. Eyre engaged in two expeditions of discovery. On the 1st of May he left Adelaide to explore the regions to the north of that settlement. He was absent nine weeks; and, during that time, he travelled about 220 miles, examining the country between Spencer's Gulf and the Murray River to about 36 miles north of Mount Arden. His party had with them ten horses and two drays, and the expedition was fitted out and supported exclusively at his expense.

Mr. Eyre returned to Adelaide on the 29th June, and on the 8th July he started for Port Lincoln. He was absent nine weeks.



This time was occupied by an examination of the line of coast from Port Lincoln to Port Bell—an extent of about 230 miles. From Streaky Bay he crossed to the head of Spencer's Gulf, about 220 miles. He returned to Adelaide on the 15th of October. On this occasion, too, the expenses of the expedition (which was accompanied by ten horses and two drays) were defrayed entirely by Mr. Eyre.

The operations of 1840-41 may be regarded as one continuous expedition. It was commenced under the auspices of the local government, which contributed a donation of 100*l.*, sundry stores, and the loan of two horses. The colonists of South Australia contributed five horses, and the payment of part of the expenses. Seven horses, and the very considerable excess of expenditure over the advances mentioned, were supplied from Mr. Eyre's private funds. All charts and plans of his routes were delivered up by Mr. Eyre to the Colonial government.

Mr. Eyre left Adelaide on the 18th of June, 1840, to attempt to penetrate into the interior of Australia. He advanced to Lake Torrens, and traced its shores for nearly 400 miles; but finding himself, from the anomalous conformation of that huge horseshoe quicksand, entangled in a *cul-de-sac*, and finding the country more-over arid and sterile, he crossed to Port Lincoln. He was thus the first to open a direct line of road to that harbour from the head of Spencer's Gulf, a distance of about 220 miles. From Port Lincoln, he, after being repeatedly baffled, but never discouraged, succeeded in tracing the whole line of coast westerly as far as King George's Sound, a distance of 1300 miles.

Mr. Eyre's tracks, on the various expeditions now recapitulated, will be found laid down from the original tracings on Mr. Arrow-smith's last and excellent map of Australia. As a means of adding something more of interest and detail to this meagre outline, it has been judged advisable to subjoin Mr. Eyre's own accounts of his excursions, as given in his reports to government.

## I. OPERATIONS OF THE YEAR 1839.

1. *Excursion from Adelaide to the Murray and eastward as far as Spencer's Gulf.*—"On the 1st of May I left Adelaide with a party of five individuals, exclusive of myself, and two horse teams with supplies calculated to last us nearly three months. For the first few days after leaving Adelaide, we passed through a considerable extent of fine and well watered country, crossing the chains of ponds named by Mr. Hill the Wakefield and the Hutt, to the latitude of about 33° 40', when the country assumed a more open character, presenting to us a considerable extent of high open downs well adapted for sheep, and abundantly watered by chains of ponds to the eastward and N.E. of the Hutt. The latter chain of ponds we traced in a northerly direction to its junction with a large water-course, which I named the 'Broughton,' near the parallel of

38° 30'. Here I found very extensive reaches of water connected by a strongly running stream; in this vicinity, too, the Broughton received several chains of ponds from the N. and N.E., and then, taking a course considerably S. of W., it wound through some very broken hills of an open barren nature, after which the stream was lost in the sandy nature of its channel, and we only found water-holes at intervals; proceeding still further, we found its channel quite dry, but very wide and deep, and its course became changed to a north-westerly direction towards Spencer's Gulf, near which I left it, as the surrounding country was of a poor barren appearance. We then passed a tract of high open country, principally covered with prickly grass, and at intervals with small patches of scrub, crossing two running streams emanating from the hills to the northward, but which both became dry in their channels a little west of where we crossed them. After leaving the latter of these in about 33° 18', we passed under the base of some bare hills rising abruptly from the level of the land around, and forming the commencement of the range running to the head of Spencer's Gulf, and in which Mount Brown and Mount Arden are situated. Under these hills we continued our course on the west side, and found that as we advanced to the northward they increased in elevation, at first taking a course somewhat west of north, and afterwards inclining a little to the eastward of that point. For some distance we found numerous creeks taking their rise among the hills, dry generally in the flat country, but with springs and small water holes among the hills; these all fall westerly towards the Gulf, through a country more or less open, and divided by belts of scrub and pine brush, similar to what we met with near the Murray. As we advanced further to the northward the country gradually became more barren, and the intervals between the water much greater and more difficult of access, until we reached the head of Spencer's Gulf, about 16 miles beyond which I encamped my party for seven days, whilst I examined the nature of the surrounding country, as each day's stage had made the appearance of the country less promising, and as our supply of water and grass had become so precarious that I did not consider it prudent to hazard the safety of my party by pushing further until I had ascertained the certainty of our being able to procure a supply of both.

"On the 18th of May I halted the party in latitude 32° 6' at a small creek, where we were enabled to water our horses about two miles up among the hills. From this point we made a careful and laborious examination of the adjacent country, and the result was our finding it impracticable to push any further inland to the N., or round the Gulf to the S.W., in so dry a season as the present. The range of hills we had followed under so long still continued, but as they stretched to the northward they had increased in elevation and in barrenness of appearance, and we rarely found even the dry channel of a water-course emanating from them. The last of these creeks that I found to the northward was about 26 miles from our dépôt, and though dry in the plains, had large reaches of very salt water in it among the hills, and in the ledges of rock where the water had evaporated we found a great abundance of pure white salt. We were, however, enabled to obtain a few quarts of tolerable water from a small hole dug by the natives in the gravel. Beyond

this creek we travelled about 12 miles further N. to a high dark looking range, standing by itself, and running in a direction nearly at right angles to the main tier, and as its elevation was considerable, I ascended in hopes of viewing a more cheering prospect. The range was of granite, and from its summit I could see to an immense distance. To the north the ranges rose in lofty broken outline, tier behind tier, of very barren rocky appearance, as far as the eye could reach; to the eastward our view was interrupted by the hills we were travelling under; to the west of these hills the country had gradually changed to a complete sandy desert, interspersed with scrub; further W. and S.W. was seen a low range, flat at the top, and gradually declining to the level of and merging into the sandy country before us; whilst to the N.W., and extending to the N. as far as the eye could reach, was to be seen a very broad glittering stripe of what seemed to be water, but which I am inclined to think was not water, but only the dry and glazed bed of where water had lodged—and of very great extent. Nowhere could we see the least sign of grass or water; the hills before me were high, barren and rocky, and there were no gum trees or other indications of water emanating from them to be seen any where—the whole was barren and arid-looking in the extreme, and as I gazed on the dismal scene before me I felt assured I had approached the vast and dreary desert of the interior, or, it might be, was verging on the confines of some inland water, whose sterile and desolate shores seem to forbid the traveller's approach. Anxious as I was to ascertain the nature of the country before me, I was at one glance convinced that in so unfavourable a season I could not hope to penetrate further. We were already 36 miles from our dépôt without finding a place where the horses could water—we had not seen a blade of grass—and the extensive and distant view before us forbade us to hope for either to the northward; we were therefore reluctantly compelled to retrace our steps to the dépôt, which we had some difficulty in reaching with our horses, as they were greatly reduced for want of food. Foiled as I was in the first and most important object I had in view, I am still of opinion that the lofty masses of ranges I saw so far away to the northward may, in a more favourable season, afford the means, and I think I may venture to say, the only means, of penetrating far into the interior.

"On rejoining my party at the dépôt, I found my overseer just returning from the S.W., in which direction I had sent him, to a high and distant range I had seen from the heights behind the dépôt. He reported that he had been out 50 miles to the S.W., to a high, barren, rocky range, from the summit of which he could see another high range, similar in appearance to the one he was upon; and the intervening country, like that he had traversed, was open, level and barren, with the bed of a dried up lake about 10 miles beyond the range he was upon, but neither water-course nor tree of any kind was to be seen, and during his whole journey he had not seen a blade of grass anywhere, or a drop of water; and the miserable condition of the horse he had brought back fully proved the wretched state of the country he had been examining.

"As our riding horses were nearly all knocked up, and the nature of the country so dry and barren, I saw no hopes of succeeding in the second object I had in view, that of opening a line of road to Port Lincoln.



Before, however, I commenced our return, I determined to examine the country more immediately on the west side of the Gulf, though I had little hopes, from its appearance, of obtaining water in that direction; accordingly I proceeded on foot, accompanied by my overseer, about 35 miles from the dépôt round the head of the Gulf. We found the land high and flat-topped, gradually declining to the south, and broken by deep gorges into portions resembling hills. The soil was soft sandy red loam, greatly mixed with stones, with here and there a little old withered grass. We could see no timber of any kind but patches of scrubby bushes and a few small pines, but not the least indication of water, and as the country before us bore the same character as that we had traversed, we were under the necessity of returning, and giving up the attempt as impracticable at so unfavourable a season as the present. In our route up the Gulf we had seen very few natives, and those were timid and alarmed at our presence; but to judge from the many and well-beaten tracks leading up the hills to the water, and the numerous fires we saw among the hills at night, I should imagine there were a considerable number in that neighbourhood. We found a singular practice prevail among them here of covering up the springs and water-holes (where there was more than one hole) very thickly with the boughs and branches of trees, as if to protect it from the rays of the sun—a circumstance I had never observed elsewhere, and which would lead me to suppose that they suffer from the scarcity of water in the dry seasons. On the western side of the Gulf we could never see the tracks or fires of the natives in any direction, though we were travelling for a great distance so near the eastern side as to have distinguished fires across the water on the other side had there been any.

"After returning on my outward track as far as  $33^{\circ} 18'$ , I struck out more to the eastward, making for the north-west angle of the Murray river as the nature of the country and supply of water enabled me to proceed. In my progress I was obliged to go further S. than I intended, and passed through a considerable extent of very fine country, and tolerably well watered, to the hills separating the country to the westward from the course of the Murray. From these hills I found a passage to the river, shorter and better as a route to Adelaide than the one in present use, and communicating at once with the unlocated country to the N. and N.W. I struck the river in  $34^{\circ} 16'$ , and followed it down to its entrance into the lake. In my progress I examined the alluvial flats in the valley, and have much pleasure in adding my humble testimony to the opinion long ago expressed by Capt. Sturt, of the great extent and rich character of the land they contain, and though nearly all are more or less covered with reeds and are partially subject to inundation, I consider this portion of land to be as rich and valuable as any I have seen, and I have only felt surprise that so few have thought it worth their while to examine the land bordering on such a noble river. After leaving the lake, I found a good pass through the ranges about 15 miles to the southward of Adelaide, and returned to town on the morning of the 29th June."

2. *Excursion from Port Lincoln to Streaky Bay, and thence to the head of Spencer's Gulf.*—"I left Port Lincoln with my party (consisting of three men, an overseer, and two native boys), on the 5th of August,

passing over a low barren country, through which were interspersed many salt lakes, to the coast, which I struck in latitude  $34^{\circ} 7'$ , and following then its general direction, I crossed a succession of low hills wooded with *casuarinæ*—grassy, but very stony, and destitute of water, except what was left by the late rains in swamps that we met with occasionally behind the sand hummocks of the coast. These stony hills—which are of limestone formation—extend but a few miles inland, and are backed by a perfectly level and scrubby country to the eastward. I found this character of land continue with little variation to about latitude  $33^{\circ}$ , when we left the stony hills, entering a lower and more sandy region, in which the scrub, consisting of the *eucalyptus dumosa* and *tea tree*, approached much nearer the sea, gradually supplanting the *casuarinæ*, until in  $33^{\circ} 40'$  the latter disappeared altogether, and the whole country, to the water's edge, became one mass of dense and almost impenetrable scrub. During our progress through the low country we had hitherto at intervals met with high bluffs of granite rising to a considerable height, and frequently visible at a very great distance, from the level nature of the surrounding land; these had now ceased, and in no direction could we obtain a view of higher or more promising ground.

"On the 25th August, I arrived with my party at Streaky Bay, and having ascertained, by reconnoitring the country a-head, the impracticability of taking our drays any farther to the westward without first cutting a road through the scrub—a work of great labour and time—I determined to form a dépôt at a spring we were fortunate enough to find about two miles S.E. of the most southerly bight of Streaky Bay, and, leaving my party here, to proceed myself on horseback and examine the country along the coast as far as I might find practicable. Being most anxious to have continued this examination to the head of the Great Bight, in longitude  $131^{\circ}$  E., I went fully prepared for remaining out the necessary length of time, taking with me one of my native boys, and a pack-horse to carry our provisions. I found the country along the coast still continue of the same character—low, barren, sandy, densely covered with scrub, and destitute of water. So close, indeed, and so strong was the nature of the scrub, that we had much difficulty in forcing our way through it, even on horseback. This dreary region extended round Streaky Bay, Smoky Bay, Denial Bay, and as far as the 133rd parallel of longitude, a little beyond Point Bell, this being the most westerly point I could reach, as the scarcity of grass and the absence of all water compelled me to return in spite of my most anxious desire to have continued our route two degrees farther west. During the whole of our course from the lower extremity of Streaky Bay to Point Bell, we had only found water once, a little to the N.E. of Point Brown, and here it was so difficult of access, and in so small a quantity, that we could not obtain a sufficiency for our horses. This, added to the very fatiguing nature of the country, had so exhausted the horses that it was not without difficulty we succeeded in taking them back safely to the dépôt. They had been four whole days without a drop of water, and the greater part of that time without food also, during which period we had ridden, at the least, 140 miles over a very heavy country. At the time of our return, the scrub



still continued very dense near the sea; and the only improvement I had observed in the character of the country was, that the land a few miles back from the coast was gradually becoming more elevated, and the intervals of plains or small openings among the scrub were getting somewhat larger and more numerous than we had met with before; but no heights were visible, nor were there the least indications of a probability of water being found more to the westward. Having observed from a height to the southward of our depôt a high and very distant peak to the eastward, I had sent my overseer out in that direction to reconnoitre the country during my absence to the westward. On his return he reported that he found water at intervals, but only in small quantities, left by the rains in clefts of rocks, and even this, he stated, was rapidly drying up. This information, added to the unfavourable state of the wind for some days past, and the fact of our supplies being reduced to rather a low ebb, decided me at once to move on the party and push across as rapidly as possible.

"On the afternoon of the 8th September we evacuated our depôt, and steered easterly, through a barren and scrubby country, very low and level, with occasional heights of granite, in the clefts of which we usually found a little water deposited by the rains. At about longitude  $135^{\circ} 25'$  E., we came to a singular mass of lofty ranges extending far to the northward and to the eastward. These ranges were devoid of timber, of a barren appearance, and consisted of granite and porphyritic granite, but principally the latter. There were neither creeks nor springs emanating from them, and the land around, to their very base, was low, barren, and scrubby, the hills themselves being nearly overrun with the prickly grass. I took the liberty of distinguishing this very remarkable range with the name of his Excellency the Governor, as it constitutes the principal feature in this part of the country, and exhibits a succession of lofty rugged ranges, one behind the other, stretching through a vast extent of country, and thus forming a striking and singular contrast to the low and level waste around.

"In this vicinity, and among the hills, we met with several small salt water lakes, with salolaceous plants growing around their margins; but we were entirely dependent on the deposit of water left by the rains among the rocks for our supply of fresh water. The supply was thus very precarious, being only procurable in small quantities at a time, and frequently at very considerable intervals apart—and even this was evidently rapidly disappearing before the rays of a very hot sun, so that I feel assured had we delayed even a few days longer at Streaky Bay, we never could have succeeded in forcing a passage across. On the 29th September we formed a depôt, being anxious, before leaving this vicinity, to see a little more of the interior to the northward. I detained my party in camp for a week, and proceeded on horseback about ninety miles beyond the depôt. In the course of this ride I ascended two or three heights in the ranges under which I was travelling, and from one of them it was evident that a lake of considerable size extended to the N. and N.W.: but as my time was very limited, and the lake at a considerable distance, I was obliged to forego my wish to visit it. I have, how-



ever, no doubt of its being salt, from the nature of the country, and the fact of finding the water very salt in one of the creeks draining into it from the hills. Beyond this lake to the westward was a low flat-topped range, extending north-westerly as far as I could see. The intervening country between Flinders Range and the Lake (which I distinguished with the name of Colonel Torrens), and extending as far as the eye could reach to the northward, consisted of extensive plains of firm red sandy soil destitute of vegetation, and divided by ridges of sand wooded with shrubs and stunted bushes. Through these plains ran many large creeks whose courses were marked by lines of lofty gum trees. These emanated from Flinders Range, and, though dry in their channels below the hills, water might generally be procured by following them up among the ranges. They all fall in a westerly direction, or a little north of west, and drain into Lake Torrens. Flinders Range still continued at the time of my return, and another small detached hill was also visible to the N.W.

"During my absence to the north, I sent out my overseer to examine the country to the eastward. He reported that Flinders Range, or rather a succession of ranges, continued for about eight miles: that he then crossed a large barren plain through which a creek was running to the northward, and which was probably one of those I had crossed after it had wound through the hills. Beyond this, he found the country consist of alternate ridges and flats of a bare and barren character, with a good deal of the prickly grass, until, at about 60 miles east of the depôt, he obtained a view of the low flat sea of scrub similar to that near the Murray river, and which probably is a continuation of that scrub extending to the northward. From this point he returned to the depôt. After leaving the camp near Mount Arden, I returned to Adelaide, passing through a great extent of fine and valuable country, well watered by numerous running streams, nearly all of which retain water even in the driest seasons.

"In reviewing the result of our labours, I cannot but regret they have not been more productive of interest and utility to the colonists. We have barely succeeded in effecting the object of the expedition by passing through a certain extent of country; and for this unsatisfactory result we are indebted solely, under Providence, to the very favourable season we experienced (and which appears to have extended generally over the colony). During the whole of our course from Port Lincoln along the coast to Point Bell, and across the interior to the head of Spencer's Gulf, a distance of 600 miles through, I believe, an hitherto unexplored country, we never crossed a single creek, river, or chain of ponds, nor did we meet with any permanent water anywhere, with the exception of three solitary springs on the coast, to which the few natives we met with appear to resort when the water left by the rains further inland is dried up.

"The variation of the compass I found to diminish as I advanced to the westward, and again increased as I advanced easterly towards Spencer's Gulf. At Streaky Bay it was only about 2° E., whilst at the head of Spencer's Gulf it was about 7° E."

## II. OPERATIONS OF 1840-41.

1. *Excursions in the Vicinity of Lake Torrens.*—Mr. Eyre left Adelaide on the 18th June, 1840, and arrived at Mount Arden, at the head of Spencer's Gulf, on the 3rd of July. From his depôt there he writes:—

"On the 6th I proceeded, accompanied by one of my native boys, on horseback, to reconnoitre Lake Torrens and the country to the north of the depôt, leaving the party in camp. I arrived on the shores of Lake Torrens the third day after leaving the depôt, and have ascertained that it is a basin of considerable magnitude, extending certainly over a space varying in width from fifteen to twenty miles, with a length of from forty to fifty from its southern extremity to the most northerly part of it, visible from a high summit in Flinders Range (about ninety miles N. of Mount Arden). The lake is girded with an outer ridge of sand, covered with salsolaceous plants, and with saline crusts appearing above the ground at intervals. Its waters extend over a considerable surface, but they are, apparently, shallow. I could not approach the water from the soft nature of that part of its bed which is uncovered, and which reached from three to four miles from the outer bank to the water's edge. There can be no doubt, however, of its being very salt, as the portion of its bed which lay exposed to our view was thickly coated with pungent particles of salt. There were not any trees or shrubs of any kind near the lake where we made it, nor could either grass or fresh water be procured for our horses. Lake Torrens is bounded on its western side by high land—apparently a continuation of the table-land to the westward of the head of Spencer's Gulf. I should think that it must receive a considerable drainage from that quarter as well as the whole of the waters falling from Flinders Range to the eastward.

"From the very inhospitable nature of the country around the lake, I could not examine it so carefully or so extensively as I could have wished. My time, too, being very limited, made me hurry away to the northward, to search for a place to which I might bring on my party, as the grass in the neighbourhood of the depôt is very old, and much less abundant than in either of my former visits there. It became, therefore, imperative on me to remove the horses as speedily as possible. Should circumstances permit, I shall, however, endeavour to visit Lake Torrens again, on my return from the northern interior. After leaving the lake I spent many days in examining the country to the northward of our depôt. Its character seemed to vary but little; barren sandy plains still formed the lower level, and the hills constituting the continuation of Flinders Range were still composed of quartz and ironstone. They are, however, gradually becoming less elevated and more detached, with intervals of stony valleys between, and the whole country was, if possible, assuming a more barren aspect, while the springs, which had heretofore been numerous among the hills, were very few in number, difficult to find, and very far in amongst the hills. After a most anxious and laborious search, I at last succeeded in finding a place about ninety miles (of latitude) N. of Mount Arden, to which I can remove my depôt,

and from which I can again penetrate more to the northward. After an absence of sixteen days I rejoined my party under Mount Arden on the evening of the 21st July.

"The high land seen on the opposite side of Lake Torrens appears to be a continuation of the table-land lying to the W. of the head of Spencer's Gulf; and though the fall of the country *appears* to be to the N., I begin to be of opinion now that it is not in reality. Lake Torrens is evidently the basin into which all the waters from Flinders Range fall, and its extent is very considerable; in fact, where I last saw it to the N. it was impossible to say whether it terminated or not, from the very great distance it was off. The country lying between Flinders Range on the one side, and the table-land on the other, and the north of Spencer's Gulf, is of so low and so level a character that the eye alone is not a sufficient guide as to the direction in which the fall may be. On my previous visits I felt convinced it was northerly, but I am now inclined to think the drainage from Lake Torrens, in seasons of wet, is to the S., into the head of the gulf; and I can only account for there not being a larger connecting watercourse than the small shallow one found when crossing from Streaky Bay—and which I did not then imagine extended far above the head of the gulf—by supposing that the seasons have so altered of late years that the overflow of the lake has never been sufficient to cause a run of water to the gulf. Should my present supposition be correct, the idea of a northerly drainage is done away with, and we have yet to come to a 'division of the waters.' My uncertainty on this most important point has made me most anxious to get my party removed to a place where they can remain until I can decide so important a point, and one on which our future prospects so much depend. The same causes that prevented my staying a little longer in the neighbourhood of the lake have also prevented, as yet, my extending my researches to the N. for more than about forty miles further than I had been when last in this neighbourhood. The only change I observed was the increasing barren appearance of the country—the decrease in elevation of the ranges—their becoming more detached, with sterile valleys between—and the general absence of springs. The rock of the higher ridges, which were very rugged and abrupt, was still the same, quartz and ironstone, but much more of the latter than I had before seen, and in some cases, with a very great proportion of metal to the stone. The lower ridges and steep banks, when washed away by the rains, presented great quantities of very pungent salt to the eye of the observer, mixed with the clay and sand of which the banks were formed; and in this neighbourhood the creeks were (though dry) all lined with the salt water tea-tree—a shrub we had never before seen under Flinders Range."

A subsequent despatch from Mr. Eyre, dated the 9th October, gives an account of their further proceedings up to the date of the despatch:—

"Upon leaving our dépôt near Mount Arden, the low, arid, and sandy nature of the country between the hills and Lake Torrens compelled us to follow close under the continuation of Flinders Range. Here our progress was necessarily very slow from the rugged nature of



the country, the scarcity of water, and the great difficulty both in finding and obtaining access to it. As we advanced, the hills inclined considerably to the eastward, gradually becoming less elevated, until in latitude  $29^{\circ} 20'$  S. they ceased altogether, and we found ourselves in a very low and level country, consisting of large stony plains, varied occasionally by sand; and the whole having evidently been subject to recent and extensive inundation. These plains are destitute of water, grass, and timber, and have only a few salsolaceous plants growing upon them; whilst their surface, whether stony or sandy, is quite smooth and even, as if washed so by the action of the water. Throughout this level tract of country were interspersed, in various directions, many small flat-topped elevations, varying in height from fifty to three hundred feet, and almost invariably exhibiting precipitous banks. These elevations are composed almost wholly of a chalky substance, coated over on the upper surface by stones or a sandy soil, and present the appearance of having formed a table-land that has been washed to pieces by the violent action of water—and of which these fragments now only remain. Upon forcing a way through this dreary region, in three different directions, I found that the whole of the low country round the termination of Flinders Range was completely surrounded by Lake Torrens, which, commencing not far from the head of Spencer's Gulf, takes a circuitous course of fully four hundred miles, with an apparent breadth of from twenty to thirty miles—following the sweep of Flinders Range, and almost encircling it in the form of a horseshoe.

"The greater part of the vast area contained in the bed of this immense lake is certainly dry on the surface, and consists of a mixture of sand and mud, of so soft and yielding a character as to render perfectly ineffective all attempts either to cross it or to reach the edge of the water, which appears to exist at a distance of some miles from the outer margin. On one occasion only was I able to taste of its waters, in a small arm of the lake, near the most north-westerly part of it which I visited, and here the water was as salt as the sea. The lake, on its eastern and southern sides, is bounded by a high sandy ridge, with salsolæ and some brush-wood growing upon it, but without any other vegetation. The other shores presented, as far as I could judge, a very similar appearance; and when I ascended Flinders Range, from which the views were very extensive, and the opposite shores of the lake distinctly visible—no rise or hill of any kind could ever be perceived, either to the W., the N., or the E.; the whole region round appeared to be one vast, low, and dreary waste. One very prominent summit in this range I have named Mount Sæle; it is situated in  $30^{\circ} 30'$  S. latitude, and about  $138^{\circ} 40'$  E. longitude, and is the first point from which I obtained a view of Lake Torrens, to the eastward of Flinders Range, and discovered that I was hemmed in on every side by a barrier it was impossible to pass. I had now no alternative left me, but to conduct my party back to Mount Arden, and then decide what steps I should adopt to carry out the objects of the expedition. It was evident that to avoid Lake Torrens and the low desert by which it is surrounded, I must go very far either to the E. or to the W. before again attempting to penetrate to the interior.

"My party had already been upwards of three months absent from

Adelaide, and our provisions were too much reduced to admit of our renewing the expedition in either direction, without first obtaining additional supplies. The two following were, therefore, the only plans which appeared feasible to me, or likely to promote the intentions of the colonists, and effect the examination of the northern interior:—

"First—to move my party to the southward, to endeavour to procure supplies from the nearest stations N. of Adelaide, and then by crossing to the Darling, to trace that river up until I found high land leading to the N.W.

"Secondly—To cross over to Streaky Bay, send from thence to Port Lincoln for supplies, and then follow the line of coast to the westward, until I met with a tract of country practicable to the N. To the first of these plans were many objections: amongst the principal ones were, the very unfavourable accounts given both by Captain Sturt and Major Mitchell of the country to the W. of the Darling river—the fact of Captain Sturt's having found the waters of that river salt during a continued ride of many days—the numerous tribes of natives likely to be met with, and the very small party I should have with me—lastly, the course of the river itself, which, trending so much to the eastward, would take us from, rather than towards, the centre of this continent. On the other hand, by crossing to the westward, I should have to encounter a country which I knew to be all but destitute of water, and to consist, for a very great distance, of barren sandy ridges and low lands, covered by an almost impenetrable scrub, at a season, too, when but little rain could be expected, and the heat would, in all probability, be intense; still, of the two, the latter appeared to me the least objectionable, as we should at least be going towards the point we wished to reach, and through a country as yet quite unknown.

"After mature and anxious consideration, therefore, I decided upon adopting it, hoping that my decision may meet with the approbation of the committee.

"Previous to our arrival at Mount Arden, we experienced very showery weather for some days (otherwise we could not have attempted a passage to the westward), and as there were no longer any apprehensions of water being found on the route to Streaky Bay, I sent two of my teams across upon our old tracks, in charge of my overseer; whilst I conducted the third myself, in company with Mr. Scott, direct to Port Lincoln, to procure the supplies we required. In crossing from Mount Arden towards Port Lincoln, we travelled generally through a low country, densely covered with brush, among which were scattered, at considerable intervals, a few small patches of grass, with here and there some rocky elevations; in the latter, we were usually able to procure water for ourselves and horses, until we arrived at the districts already explored, in traversing which we passed (to the N.E. of Port Lincoln) some rich, well-watered valleys, bounded by a considerable extent of grassy hills well adapted for sheep or cattle, arriving at Port Lincoln on the 23rd October. As a line of route from Adelaide for the immigration of stock, the course followed, though it cannot be called a good one, is perfectly practicable in the winter season; and I have no doubt, when the country becomes better known, the present track might be considerably improved upon, and both grass and water obtained in the greatest abundance."

2. *Overland Expedition to King George's Sound.*

Mr. Eyre has narrated the progress of this enterprise in the three despatches here subjoined:—

*Mr. Eyre to the Chairman of the Committee for Promoting the Expedition.*

"SIR—I have the honour to acquaint you, for the information of his Excellency the Governor and the colonists interested, with the unsuccessful termination of the expedition placed under my command, for the purpose of exploring the northern interior. Since my last report to his Excellency the Governor, containing an account of two most disastrous attempts to head the Great Australian Bight, I have, accompanied by one of my native boys, made a third and more successful one. On this occasion, I with some difficulty advanced about fifty miles beyond the head of the Great Bight, along the line of high cliffs described by Flinders, and which have hitherto been supposed to be composed principally of chalk. I found the country between the head of Fowler's Bay and the head of the Great Bight to consist of a succession of sandy ridges, all of which were more or less covered with a low scrub, and without either grass or water for the last sixty miles. This tract is of so uneven and heavy a nature that it would be quite impossible for me to take a loaded dray across it at this very unfavourable season of the year, and with horses so spiritless and jaded as ours have become, from the incessant and laborious work they have gone through during the last seven months. Upon rounding the head of the Bight, I met with a few friendly natives, who showed me where both grass and water were to be procured. at the same time assuring me that there was no more along the coast for ten of their days' journeys (probably one hundred miles), or where the first break takes place in the long and continuous line of cliffs which extend so far to the westward of the head of the Great Bight.

"Upon reaching these cliffs I felt much disappointed, as I had long looked forward to some considerable and important change in the character of the country. There was, however, nothing very remarkable in their appearance, nor did the features of the country around undergo any material change. The cliffs themselves struck me as merely exhibiting the precipitous banks of an almost level country of moderate elevation (three or four hundred feet), which the violent lash of the whole of the Southern Ocean was always acting upon and undermining. Their rock formation consisted of various strata, the upper crust or surface being an oolitic limestone; below this is an indented concrete mixture of sand, soil, small pebbles, and shells; beneath this appear immense masses of a coarse greyish limestone, of which by far the greater portion of the cliffs are composed; and immediately below these again is a narrow stripe of a whitish, or rather of a cream-coloured substance, lying in horizontal strata, but which the impracticable nature of the cliffs did not permit me to examine. After riding for 45 miles along their summits, I was in no instance able to descend; their brinks were perfectly steep and overhanging, and in many places enormous masses appeared severed by deep cracks from the main land, and requiring but a slight touch to plunge them into the abysses below. As far as I have



been along these cliffs I have seen nothing in their appearance to lead me to suppose that any portion of them is composed of chalk. Immediately along their summits, and for a few hundred yards back, very numerous pieces of pure flint are lying loosely scattered upon the surface of the limestone. How they obtained so elevated a position, or whence they are from, may admit, perhaps, of some speculation. Back from the sea, and as far as the eye could reach, the country was level and generally open, with some low prickly bushes and salsolaceous plants growing upon it; here and there patches of the gum scrub showed themselves, among which a few small grassy openings were interspersed. The whole of this tract was thickly covered by small land shells, about the size of snail shells—and some of them somewhat resembling those in shape. There were no sudden depressions or abrupt elevations anywhere; neither hills, trees, nor water, were to be observed; nor was there the least indication of improvement or change in the general character of this desolate and forbidding region. The natives we met with at the head of the Bight were very friendly, and readily afforded us every information we required—as far as we could make them comprehend our wishes.

“We most distinctly understood from them that there was no water along the coast, westerly, for ten days’ journeys; and that, inland, there was neither fresh nor salt water, hills or timber, as far as they had ever been; an account which but too well agreed with the opinion I had myself formed, upon ascertaining that the same dreary, barren region I had been traversing so long still continued at a point where I had ever looked forward to some great and important change taking place in the features of the country, and from which I had hoped I might eventually have accomplished the object for which the expedition was fitted out. Such, however, was not the case; there was not any improvement in the appearance of the country, or the least indication that there might be a change for the better, within any practicable distance. I had already examined the tract of country from the longitude of Adelaide to the parallel of almost  $130^{\circ}$  E. longitude—an extent comprising nearly  $8\frac{1}{2}$  degrees of longitude—without my having found a single point from which it was possible to penetrate far into the interior; and I now found myself in circumstances of so embarrassing and hopeless a character, that I have most reluctantly been compelled to give up all further idea of contending with obstacles which there is no reasonable hope of ever overcoming. I have now, therefore, with much regret, completely broken up my small but devoted party. Two of my men returned to Adelaide, in the *Waterwitch*, five weeks ago.

“Mr. Scott and another of my men proceed on Monday in the *Hero*; whilst myself, my native boys, and the overseer (who has chosen to accompany me) proceed hence overland to King George’s Sound, as soon as our horses are a little recruited by the abundant supply of forage we received by the *Hero*.

“EDWARD JOHN EYRE.

“Fowler’s Bay, 30th Jan., 1841.”

*Mr. Eyre to the Colonial Secretary of South Australia.*

" Having left Fowler's Bay on the 26th February, 1841, I arrived at the head of the Great Australian Bight, on the 3rd March. Here we halted four days to rest our horses, as they had been three days without water previous to our arrival at the head of the Bight. From this point we had 135 miles to travel without water, until we had passed the first of the remarkable line of cliffs mentioned by Captain Flinders. In effecting this passage, our horses were five days without water, and were consequently much reduced in strength and condition. The line of cliffs now receded some miles from the coast, but still continued running nearly parallel to it inland, and forming a perfectly level bank, visible beyond the low and barren country intervening between it and the sea; until, as we advanced, the whole merged in a succession of high sandy or stony ridges, covered by a dense and impenetrable scrub, and reaching to the very borders of the sea. To attempt a passage through such a tract of country was quite out of the question, and we were consequently obliged to keep very near the coast, and frequently to trace round its shores for many days, thus considerably increasing the distance we should otherwise have had to traverse. For four days we continued to travel steadily without finding water; on the fifth our horses were much exhausted, and one by one, three of our best dropped behind, and we were compelled to leave them to their miserable fate. The other poor animals still continued to advance with us, although suffering much from the almost total want of food as well as water. This dreadful state of suspense and anxiety continued until the afternoon of the seventh day, when, by God's blessing, we were once more enabled to procure water by digging among the sand drifts of the coast,—after having accomplished a distance of fully 160 miles: throughout which not a drop of water could be procured, even by digging.

" We had now seven horses left, but they were barely alive. For eight months previous to our leaving Fowler's Bay, they had almost incessantly been occupied in the labours of the expedition to the northward; and in that space of time had travelled over a distance almost incredible; and it required far more than the short month we were able to afford them at Fowler's Bay, to recruit their exhausted strength, or renew a spirit that was almost broken by incessant toil. It may readily, therefore, be imagined that the severe privations they endured in rounding the Great Bight had reduced them to perfect skeletons, without either strength or spirit. To me it was only a matter of surprise that a single horse should have survived such extremity of suffering. We were now at a place where we could procure abundance of water, but there was scarcely any grass for our poor horses, and the little they could find was coarse, sapless, and withered. To add to our difficulties, we were almost without provisions. In the early part of this journey, we were obliged to abandon the heavy part of our baggage; water-kegs, ropes, buckets, horseshoes, tools, medicines, pack-saddles, clothes, great-coats, and part of the ammunition, were all left behind. As we advanced, and our horses became weaker, it was necessary to leave even the provisions, instruments, and the remainder of our ammunition, light though they were; while we hurried on with the wretched animals, scarcely daring

to hope that it might yet be possible to save their lives. Having arrived at the water, and rested there during six days, I sent my overseer and one of the native boys (with the three strongest of the horses driven loose) to try to recover the things we had last left, and which were about 50 miles from the water; those abandoned earlier on the journey were too far distant for us to attempt their recovery. On the fifth day they returned, after a most painful journey; one of the horses had perished, the other two almost dead, and the party had only succeeded in bringing a portion of the baggage they were sent for. As there were many things among those they had not brought which we could ill afford to spare, I left the overseer in charge of the party, and the day following his return I proceeded myself, accompanied by one of the elder boys, but without horses, to make a second attempt for their recovery; this I effected, and on the fourth day rejoined my party at the water. Our horses were now reduced in number to five, and the whole were so thoroughly jaded and worn out, that it was evident we could not attempt to move from our present position for some time to come, especially as we had the gloomy prospect of a vast extent of country before us in which there was not the least hope of water being found. In the meantime our provisions were rapidly disappearing. From the very commencement of the journey our weekly allowance had been very limited—gradually it had been further reduced—and now that a long delay was unavoidable, I found it necessary to kill one of the horses to enable us to husband the little flour we had remaining.

“Hitherto my labours had been comparatively light—for in the midst of all the cares and anxieties by which I was surrounded, my overseer had placed the most implicit confidence in my guidance, and had cheerfully gone through the duties that fell to his share. This support I no longer experienced, and it was with the greatest pain I discovered that my fellow traveller had become disheartened and dispirited, foreboding evils that might not occur; and though he still exerted himself readily and strenuously on every occasion, I could readily perceive that (although the greatest difficulties of the undertaking were over) he was disinclined to continue the expedition, and would rather have attempted to re-cross the fearful country behind us in the vain hope of being able to return to Fowler's Bay, where we had left a considerable depôt of provisions. This dispiriting impression became, unfortunately, conveyed to all the native boys, and eventually became the cause of an occurrence as frightful as it was fatal to the poor fellow with whom it had originated. In the earlier stages of the expedition the three native boys had behaved well, and been very servicable; but, as we advanced, this good conduct gradually disappeared, and, added to our other annoyances, not long after leaving Fowler's Bay, it became necessary for the whole party to walk, and though the native boys were allowed to ride long after myself and the overseer had given it up, it at last became imperative, from the state of the horses, they should be dismounted. This, added to the insufficient quantity of food which our low state of provisions allowed to each individual, made the three boys gloomy and sulky, and we had frequently much trouble in getting them to assist in any way; and then the little they performed was rarely done with cheerfulness and good humour. It



was impossible to make them understand the necessity of the case. As long as ever a horse could walk, they considered it a hardship not to ride, and as long as there was an ounce of provisions left they considered themselves ill-used if not allowed to eat to excess. It was of no avail telling them that, if the horses were ridden they could never get through the journey, and that we should have to carry everything ourselves—or, that, if we consumed the little stock of provisions we had all at once, we must starve afterwards. The fact of myself and overseer walking and living on the same allowance of food as themselves was no argument to them; and we could not dissipate a sullen discontented humour. This sullenness of disposition became much augmented, when they perceived that the overseer himself was doubtful and disheartened at our future prospects, and I really think their impression was, that we could never accomplish the journey we had undertaken. In this frame of mind it was they deserted from the party (April 22nd), after being detected stealing the provisions during the night—a practice they had continued some days before they were found out. After an absence of four days they returned, and begged to be forgiven, stating that they were unable to procure food of any kind for themselves. As they were freely received again, I had strong hopes that their future conduct would be better, but it would appear from the sequel that they were still unwilling to continue to prosecute the journey, that they still looked back with longing to the provisions left at Fowler's Bay, and that they had only rejoined the party again with the view of plundering the camp of provisions at the first favourable opportunity, and then endeavouring to retrace their steps to a place where they knew plenty had been left, and from thence (should they succeed in arriving there) they might eventually make their way to Port Lincoln, or get away in some of the vessels whaling along the coast. This scheme was unhappily but too successfully executed during the night of the 29th April, whilst I was absent from the camp, engaged in watching the horses to prevent them straying. After plundering the stores of provisions and fire-arms, it would appear they were preparing to depart, when the unfortunate overseer awoke, and in his attempt to prevent their purpose fell a victim to these ruthless murderers.

"A copy of the depositions of myself and the boy Wylie (who did not accompany the other two), relative to this melancholy occurrence, is herewith enclosed for the information of his Excellency.

"I was now deprived of my only aid, and felt bitterly the loss of a man whose fidelity and good conduct had retained him in my service for many years, and whose unwillingness to leave me, when I commenced this perilous journey, has been the unconscious means of his own destruction. At a distance of fully 450 miles from Fowler's Bay, and nearly 600 from King George's Sound, I was now in a position but little to be envied. Left alone with a single native, whose fidelity I could place no dependence upon, with but little provisions, and almost without arms, whilst my jaded horses had already been three days without water. I had no time for deliberation. To attempt to retrace my steps to Fowler's Bay I knew would be certain destruction—it would have been impossible for us to re-cross that fearful country—and I had, therefore, no alternative but to push on for King George's Sound, humbly trusting

in the merciful protection of that Almighty Being, who alone may guide the wanderer on his way in safety.

"Hurrying away from the fatal scene, I advanced with the native boy four days longer without finding water, during which we travelled with but little intermission almost night and day. On the fourth day we again procured water by digging, but as this made the seventh day that the horses had been (for the second time) without water, and during which they could not have travelled less than 150 miles, they were much exhausted by fatigue and privation; and it again became necessary to make a long delay to afford them a temporary rest.

"Our stock of flour was now reduced to sixteen pounds, and we had still nearly 500 miles to travel before we could hope to obtain relief, so I was again under the necessity of killing one of our remaining horses, to enable us to halt and afford to the other four that rest which they so much required. This supply, together with a couple of kangaroos and a few fish we were lucky enough to procure, lasted us nearly a month, and we were steadily advancing on our journey, towards the promontory of Cape le Grand, where my intention was to have killed another horse, and halted again for a few days' rest. Fortunately we were spared the necessity of doing this, for on approaching the Cape on the east side, we were overjoyed to discern, on the 2nd June, a large vessel lying at anchor in a bay, immediately east of Lucky Bay, and which I have named Rossiter Bay. She proved to be a French whaler, the *Mississippi*, of Havre, commanded by Captain Rossiter. Having made known our situation to the captain, both myself and the native boy were most hospitably treated on board his vessel, and received every attention and kindness during the twelve days we remained. Upon our leaving to proceed on our route, we were most liberally furnished with everything we could wish for; and I am happy to have it in my power to record publicly the great obligations I am under to Captain Rossiter for his kindness and attention.

"After leaving Rossiter Bay, on the 15th June, we advanced steadily towards King George's Sound, arriving there, with four horses still left, on the 7th July; and thus, by God's blessing, terminating a journey that, from circumstances, had been peculiarly harassing, and which, from unforeseen difficulties, had been protracted to a period far beyond what had been at first anticipated.

"Albany, 26th July, 1841."

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*Mr. Eyre to the Colonial Secretary of Swan River.*

"Sir,—I have the honour to report to you, for the information of his Excellency the Governor, my arrival in the colony of Western Australia overland from Adelaide, and though I regret extremely that my labours have not been productive of any discovery likely to prove beneficial to either colony, I am induced to hope that a slight outline of my route, and of the character of the country I have been traversing, may not prove uninteresting to his Excellency in a geographical point of view.

"On the 25th February I left Fowler's Bay with a party consisting of an overseer and three native boys. I was provided with ten horses,

and provisions calculated for nine weeks. Upon entering within the limits of Western Australia, I found the country extending around the Great Australian Bight, for upwards of five hundred miles, to consist entirely of the fossil formation, with a considerable elevation above the level of the sea, varying, perhaps, from two hundred to three hundred feet, and forming for the most part a country which presented the appearance of an elevated and almost level table-land. This extensive region is of the most desolate and barren character imaginable; almost entirely without grass, destitute of timber, and in many parts densely covered with an impenetrable scrub. There was no surface water, neither were there creeks or water-courses of any description. The only supply of water procured by the party through this dreary waste was obtained by digging in the drifts of pure white sand found along the coast at places where the great fossil bank receded a little from the immediate margin of the sea. The supply thus obtained was very precarious; and, during the progress of our journey, we crossed over, at various times, intervals of sixty, one hundred and thirty-six, and one hundred and fifty miles in extent, throughout which it was impossible to procure a drop of water in any way. In this fearful country our horses suffered most severely, and on two different occasions were seven days without any water, and almost without food also. From this cause we lost many valuable animals; and our progress was impeded by the frequent and long delays necessary to recruit those that were still left alive. Our journey thus became protracted to a period far beyond what had been calculated upon; and it became imperative, not merely to economise the provisions we had brought with us, but, eventually, to destroy two of our horses as an additional supply of food to the party. In the midst of these difficulties, and then barely half-way across the Great Bight, my very small party was broken up by an event as distressing as it was tragical, and I was left alone with a native of King George's Sound. This melancholy occurrence, added to the weak and jaded condition of the few remaining horses, effectually prevented my examination of the country beyond the line of my immediate route; in fact, from the time of our entering the colony of Western Australia, such was the dreadful nature of the country, that the whole party were obliged to walk; and it was not until our arrival at East Mount Barren that myself and the native boy could venture to ride. The first improvement observed in the face of the country was the finding a narrow strip of grassy land immediately to the eastward of Point Malcolm; but it was not until we had passed Cape Arid that we met with the first permanent surface water, in the shape of a small fresh-water lake. The character of the country was now changed, and consisted of open, elevated, sandy downs, covered with shrubs and underwood, and generally based upon an oolitic foundation, with here and there a few granite bluffs. We now crossed on our route many salt-water creeks or inlets, most of which received drainage of either brackish or fresh-water from the interior. The first of these occurs immediately E. of Cape Arid; but it is very small, and separated from the sea by a bar of sand. Others, as we advanced farther to the westward, were of a more considerable size, and bore the appearance of being connected with the sea. These might,



possibly, afford secure harbours for boats, but the circumstances under which I was travelling did not admit of my delaying to examine them, and, for the convenience of crossing, I usually kept so far inland as to intercept them above the termination of the salt-water reaches. The high downs among which these water-courses wind are, as I remarked before, sandy, and covered with shrubs, and the soil poor, and destitute of grass; but in the valleys themselves, and in small portions of the slopes immediately above them, we found some patches of good and, occasionally, of rich soil, upon which the herbage was abundant and luxuriant. These tracts, however, as far as I could judge, were of very limited extent; nor was there any timber in their vicinity, beyond the few small stunted tea trees growing along the banks of the water-courses. At intervals between these various creeks, we met with many holes—sometimes of salt, at other times of fresh, water. A few tea-trees, and occasionally a few straggling eucalypti, grew around their margins; but I seldom succeeded in finding any grass.

“Passing behind Lucky Bay to the lagoons W. of Esperance Bay, I traversed a considerable extent of grassy land, consisting principally of sandy undulations, but with many patches of rich soil in the flats and valleys. Water appeared to be abundant; but there was still a total absence of all timber but the tea-tree. From the salt lagoons we crossed over a very barren country, and had much difficulty in procuring any grass for our horses. The water is generally very brackish, and there is much scrub. The rock formation was principally quartz, ironstone, and sandstone, with much grit on the surface. About sixteen miles N.E. of Cape Riche, we fell in with a considerable salt-water river from the W.N.W., which appeared to join the sea at a gap left by Flinders in the coast line, and marked as ‘a sandy bight, not perfectly seen.’ We found several permanent pools of fresh-water not very far distant, in deep narrow gullies, by which the country hereabouts is much intersected. From the depth of the river, and boggy nature of its bed, we were obliged to trace its course for about ten miles from the sea before we could cross. Here the water-course was obstructed by a ledge of rocks, and its channel appeared to become more contracted and rocky, whilst the soil, for the most part, is of an inferior description. Along its immediate banks there was a little grass, and more wood than we had previously seen anywhere; the trees are, casuarina, tea-tree, and eucalypti. Beyond the point at which I crossed the river, the country (as far as I was enabled to judge from a distant view) appeared to improve somewhat; many clear and seemingly grassy patches were seen on the slopes towards the river: and good runs, for either sheep or cattle, might probably be found in this direction. After crossing the river, we met, for the first time, with stunted trees of the kind called the mahogany; but it was not until we had passed some miles to the westward of Cape Riche that we saw any large trees, or got into a country that could properly be called a timber one. Here the mahogany, red gum, casuarinae, and other trees common at King George’s Sound, abounded, and formed a tolerably dense forest nearly all the way to that settlement. From the head of Doubtful Island Bay, I had kept some distance from the coast, cutting off the various corners as circumstances admitted, and cannot, therefore, give an opi-

nion of the country immediately upon the coast line. That portion of it, however, which lies between Cape Riche and King George's Sound is, I believe, already too well known to require any further examination.

"On the 2nd June we had met with a French whaler, the *Mississippi*, of Havre, commanded by Captain Roseiter. To this gentleman I am much indebted for the very kind and hospitable reception I experienced during a residence of twelve days on board, whilst my horses were recruiting after their severe toils, and for the very liberal manner in which I was furnished with supplies for prosecuting my journey to King George's Sound. At the latter place I arrived on the 7th July instant, after having travelled over an extent of country which, from sinuities of the coast line and other obstructions, has exceeded upwards of 1040 miles in distance from Fowler's Bay; and for the last 590 miles of which I was unaccompanied by any but a native of King George's Sound, known by the name of Wylie, and whom I would respectfully recommend to his Excellency the Governor, as deserving of the favour of the Government, for services rendered under circumstances of a peculiarly trying nature. I have omitted to state that, during the progress of our journey, we met with very few natives, and these, for the most part, are timid but well disposed. The language spoken by them is exactly similar to that of the natives of King George's Sound as far as the promontory of Cape le Grand; and this similarity may probably extend to the commencement of the Great Cliffs, in about longitude 124½ E. A little beyond this point the language is totally different, and the boy Wylie could not understand one word of it.

"EDWARD JOHN EYRE.

"Albany, July 26th, 1841."

## II.—*Map of the Route from Tajurrah to Ankober: Letter from Dr. BEKE.*

*To Colonel Jackson.*

DEAR SIR,—In my letter of the 3rd of March, 1841, to your predecessor, Captain Washington, announcing my arrival in Shwa, as published in the last volume of the Society's Journal (vol. xii., p. 84), appears the following passage:—"I flatter myself that the Map of Captain Harris, and the Table of Observations I now forward you, will be allowed to be a valuable addition to the geography of Africa. When I get my notes in order you shall have a number of bearings, and also, perhaps, some slight alterations and additions to the map; but I apprehend it is on the whole pretty correct." To which passage is appended the following note by the Editor of the Journal:—"Along with Dr. Beke's letter was received a copy, made in the Chief Engineer's Office,

Bombay, of the 'Map of the Route from Tajurrah to Ankóber, of the Mission under Captain Harris to the Court of Shoa, 1841: surveyed by Assistant-Surgeon R. Kirk and Lieut. Barker, I.N.'"

I have not my original letter to refer to, nor do I recollect the precise expression in my letter with respect to the map accompanying it.\* But this map, instead of having been prepared by Messrs. Kirk and Barker, was the result of my own personal observations, and prepared by myself alone, the original, dated Angolalla, the 27th February, 1841, now in the archives of the Royal Geographical Society, having been transmitted to Captain Haines, the political agent at Aden, in order that a copy of it might be made for the use of the Mission to Shoa, on their road up from Tajurrah; which copy was made accordingly, it having been shown me by Mr. Kirk at Ankóber, subsequently to the arrival of the Mission there in August, 1841.

I can, however, well understand how "the map of Captain Harris" came to be alluded to in my letter as *printed in the Journal*. This letter was of course not printed until several months after it was received, and whilst it was passing through the press, Mr. Kirk's Journal, contained in a subsequent portion of the same volume (p. 221), was received, and *with it* the Map of Messrs. Kirk and Barker; which being thus before the eyes of the Editor of your Journal was unintentionally referred to by him instead of mine.

The mistake in itself is of no great moment; and the chief reason for noticing it, and requesting it may be rectified, is, that I may not appear to disparage the labours of *others* in speaking of my making "alterations and additions to the map," and that "I apprehend it is on the whole *pretty correct*." This I was quite warranted in saying of my own work, but certainly not of that of two officers like Messrs. Kirk and Barker, with whom I do not pretend to place myself in competition, and whose map, I am persuaded, corrects the imperfections of mine.

I am, dear Sir,

Yours most faithfully,

CHAS. F. BEKE.

*Walsingham Place, Kennington Road, Lambeth,  
30th October, 1843.*

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\* The precise expression was, "I expect without vanity that the communication you will receive from Captain Harris at the same time with this (the map, and note of observations) will be looked upon as a valuable addition to the geography of Africa," &c. But when the papers for the Geographical Society's Journal were put into the hands of the present editor, the only map of the Route from Tajurrah to Ankóber he received was a copy of that of Captain Harris, which he accordingly believed to be the map referred to by Dr. Beke. Hence the error which that gentleman explains in the preceding letter, and which the editor is anxious to rectify.



III.—*New Zealand.*

Recent accounts from Cook's Straits show that discovery is making steady if not very rapid progress; and it is to be hoped that the settlement of Banks's peninsula will, under the auspices of Captain Fitzroy, contribute to extend our knowledge of the middle island.

The most instructive of the recent expeditions have been those made by Mr. Cotterell in the middle, and Mr. Kettle in the northern island.

Mr. Kettle ascended the Manawatu for several days, and then striking off from the river to the E., found an easy passage into the valley of the Ruamahunga, which he descended to Palliser bay. The result of Mr. Kettle's researches seems to justify the belief that the country between Port Nicholson on the S., Lake Taupo on the N., the ocean on the E., and the plain from which Mount Egmont rises on the W., is a high table-land along which two or three parallel mountain ridges, separated by elevated valleys, run nearly from N. to S. The E. declivity appears to be abrupt. In the central valleys, and on the W. declivity, the terrace form appears to be not unfrequent.

Mr. Cotterell penetrated nearly due S., from Nelson along the eastern confluent of the Waimea, and turning E. through a pass in the mountains when near its sources, he gained the valley of the Wairoo, and descended in a direction rather to the N. of E. till he reached Cloudy Bay. In this excursion Mr. Cotterell appears to have turned the sources of the Pelorus river, leaving them to the N. The pass through which he gained the Wairoo from the Wairoa\* does not appear really to cross the principal mountain range; in other words, both the Wairoo, which has its embouchure in Cloudy Bay, and the Waimea, which has its embouchure in Blind Bay (D'Urville's Tasman's Bay), appear to descend the northern declivity of the great range. Considerable difficulty having been experienced in constructing a road from Nelson to the Wairoo, a party was formed to explore the mountains in search of a pass to the N. of that discovered by Mr. Cotterell. The expedition was unsuccessful, as will appear by some notes from the journal of one of the party, which are subjoined.

Considerable additions would have been made to our knowledge of Banks's peninsula by a visit which Captain Smith, late of the Royal Artillery, paid to it, had not that gentleman been unfortunately wrecked on his return to Wellington, and his notes of survey and drawings lost. All that we have, in consequence of this misfortune, is a sketch-plan (from memory) of Port Cooper, and some

\* The Waimea is formed by the confluence of the Wairoa flowing from the S.E. and the Waiti from the S.W.

notes of an excursion from Akaroa to that inlet. Captain Smith concurs with Mr. Duppa and Captain Daniell in representing the neck which joins the peninsula to the main as equal in breadth to the peninsula itself. He mentions that cattle have been driven from the angle formed by the junction of the S. shore of the peninsula with the main, to Akaroa in eight hours. From the innermost extremity of the inlet of Akaroa to the innermost extremity of Pigeon Bay he found to be a march of three hours. From Pigeon Bay to Port Levy (or Port Ashley) is a distance of five or six miles; and a narrow headland separates the entrance of Port Levy from that of Port Cooper. A river from the main is said to flow to within two miles W. of a point about half-way up Port Cooper, and to join the sea six miles N.W. of its western headland: another river joins the sea about nine miles further north. Both are navigable to some distance inland for small craft. Extensive plains running far inland extend along the coast both to the N. and S. of Banks's peninsula. The representation of Lookers-on Bay as a fine harbour is contradicted. The inlets in Banks's peninsula are represented as good harbours, but the nearest safe harbours on the main are said to be Port Underwood in Cloudy Bay, and Port Otago at an equal distance to the S. The great mountain range S. of Nelson appears to terminate at the S. cape of Cloudy Bay, and to stretch thence in a S.W. direction.

We subjoin the notes of the last unsuccessful expedition in search of a pass from the Wairoa to the Wairoo valley alluded to above.

*“ Gleanings from a Journal of an Excursion in search of a Route to the Wairoo Valley.*

“ In consequence of the report of Mr. Tuckett and Captain England, as to the difficulty of forming a road from the great Wairoo plain to Nelson, and the distance necessary to be traversed which such a line of connexion would ensure, a party determined to start from the Waiuea, and, proceeding along the course of the Wairoa river through the mountain ranges, endeavour to discover a pass round the northern extremity of the great blue range, and thence, along some of the minor gorges, to enter the Wairoo valley from the N.W. Accordingly, on the 12th March last, Messrs. Thomson, Macdonald, Cantley, and Empson, together with Panter, Coster, Nodin, and Carter, drove from Nelson to Mr. Duppa's house, Waiuea East, where they were joined by Mr. Tytler and myself, from whence we set out on foot, at two P.M., carrying, as we conceived, ten days' provisions with us; but, owing to one of the party having unfortunately forgotten his bag on ascending the vehicle which bore him from Nelson, and to a scarcity of game, which we had calculated on supporting us for at least a week longer, it subsequently turned out that we had grievously miscalculated our resources.

“ We proceeded up the left bank of the Wairoa for about a mile, when,

owing to the increasing steepness of the ground on that side, we crossed to the right. About another mile higher up, the river separated into two branches of about equal magnitude; the branch on our right coming from S. by E., and apparently deriving its support from the confluence of several minor streams descending from the blue range opposite that part of the Waliti valley emphatically termed the 'Spout.' On the right bank of this branch is a wood of very superior pine, covering an extent of about 200 acres. The left branch, as far as was visible from its junction, bore E.N.E., which, it being almost in accordance with our proposed course, we followed. The walking here became most fatiguing from the denseness of the fern; and owing to the delay consequent upon it, and the late hour at which we had set out, we encamped for the night at a distance of more than four miles from our place of starting. The course of the river here was to the N.E. After having prepared 'break-winds' and beds of fern for the night, we proceeded to supper, and at an early hour some of the party retired to what, by courtesy, were termed their bedrooms, whilst the others amused themselves in fishing for eels, which were most abundant, attracted by the reflection of our fire on the water.

"13th.—Owing to the height of the hills opposite our camp the sun did not surmount the neighbouring ridges till 20 minutes past 7. At a quarter past 8 we set out again along the course of the river. About half a mile above our camp another bifurcation of the river took place, the left branch appearing to run N. half W., the right or middle branch (which we followed) N.N.E., afterwards due E. A short distance higher up, we ascended with some difficulty to the top of a tolerably high hill, from which the white bluffs opposite the haven (seen in the distance) bore N.N.W. We descended on the other side of the hill and again joined the middle branch of the Wairoa which here turned due S., which direction it seemed to hold for about 3 miles, after which we were unable to trace its course through the different mountain ranges. We crossed it at this point, and, leaving it at right angles, ascended a long gorge running nearly due E., clothed with prickly thorns and manuka, crossed the top of the range at the end, and, descending on the other side, camped beside a small rivulet. From the almost impenetrable nature of the country we had gone over, the distance traversed this day was not more than 8 miles.

"14th.—Set out in a direction about E.N.E., towards the top of a high range running nearly N. and S. After having walked for about half an hour through a dense brushwood, in Indian file, we discovered that we had lost one of our party, who had hitherto brought up our 'rear rank.' We sat down and cooled for some time but without effect; but after having proceeded a short way further, still cooling at intervals, we heard him shouting in a parallel direction to our course, higher up the range, and, on replying, he presently joined us, when he informed us that, having sat down for a few minutes, and afterwards having missed our track and wandered by himself for some time, he had conceived that he had totally lost us, and had begun seriously to reflect on the prospect of finding his way home, without anything more substantial to live upon than a kind of tent, formed by a pair of sheets which he carried, and a



little dog, the mode of compassing whose death (not having a knife with him) had given him considerable uneasiness, and he had just commenced to canvas the respective merits of throttling or dashing its head against a stone, when he was relieved by hearing our shouts beneath him, and, for the present at least, the little dog's life was spared. After 3 hours' severe scrambling we got to the top of the range, descended on the other side, and followed the course of a rivulet running N. and N.W., which we afterwards found joined the left branch of the Waimea. After having proceeded about 3 miles down this stream, we were obliged to encamp for the night, as some of the party were knocked up, and refused to proceed any further that day. The length of journey this day about 7 miles.

" 15th.—Commenced by ascending a high range E. by N. from where we camped. On arriving at the top saw the northern extremity of the blue range, bearing E. half N., about 7 miles off. On looking towards the N. we saw the left branch of the Wairoa, which we had left on our second day's journey, and which, having run in the shape of a horse-shoe, first N. and then E., was now running in a south-easterly direction. We descended about a mile to the bottom of this range, and commenced ascending a tributary of this branch, which (from its rapid ascent) we named Ascension Rivulet. The bed of this stream was covered with many varieties of porphyry and quartz, and the banks on both sides were clothed to the water's edge with dense masses of wood—totara, black birch, with here and there some remu, with an underwood of manuka and supplejack, and many beautiful varieties of laurel, interspersed with myrtle-trees in full bloom, bearing the most magnificent scarlet flower. We held our course along the centre of the bed of the stream, which much resembled an interminable flight of stairs. After a slow progress of about 3½ miles, we camped for the night on a heap of shingle on the edge of the water. Length of journey to-day 7 miles. During the course of our progress some of the party had repeatedly set fire to the masses of wood as well as fern which we encountered, without indeed any visible reason for so doing, beyond the making manifest their powers of destroying the very great natural beauty which many of the glens and mountain passes presented. These fires, owing to the quantity of dry and decayed brushwood and fallen timber, spread rapidly, and we had, on two or three occasions, to make considerable efforts to prevent the trees and grass in the vicinity of our different resting-places for the night from being ignited; but to-day, no sooner had we well finished our supper, when masses of smoke, tinged to a deep blood-red by the flames beneath them, which had followed our course sluggishly all the day, began, faster and yet faster, to close up the bottom of the glen we had just been ascending, and as a strong breeze had sprung up at sunset from the S.W., the fires had, in the course of a few hours, spread themselves over an immense track of mountain ranges. The stream on the edge of which we rested was not more than eight or ten yards across, and the timber was more than ordinarily thick in our immediate vicinity. Retreat down the stream was impossible, as from thence the flames were advancing. On either side, or up the stream, even had we daylight to aid our steps, escape was equally shut out, from the steepness of the

mountains which rose on all sides, had they been clothed even with the smoothest turf, instead of an almost impervious brushwood. Owing to the fire whilst opposite us having not yet had time to spread far from the place of its recent ignition before it passed to leeward, the heat was much less than if the whole burning mass had approached at once; and after the larger fires, at least in our immediate neighbourhood, had ceased, when they arrived at the space just passed over by the lately ignited fires, we, then feeling the danger over, gave ourselves up to admire the awful sublimity of the flames as they ran along the heights, and after looking on for some time longer in admiration, we gradually rolled ourselves up in our blankets, and sought from all our toils a genial repose, taking as nightcap a dram which might with some justice be termed the essence of the 'River-Spirit,' it having been produced from a bottle of brandy found in the bottom of the stream, having been dropped there unknowingly in the quondam flurry of the party to secure their effects from the flames. Whether the individual having so done had conducted towards its preservation or not was left an 'open question.'

"16th.—Woke from our slumbers to behold a mournful picture of blackened branches, stumps, and still smoking logs, melancholy brooding around. After breakfasting pursued our journey up the watercourse, the ascent waxing more arduous at each step; blocks of rock, as if cut into the most fantastic shapes, strewn over the bed of the stream; masses of sienite and quartz, beautifully variegated, serving as stepping, or rather clambering stones. After about 4 miles severe travelling, we arrived at the top of a piece of flat table-land, forming a kind of shoulder to the northern extremity of the blue range, from which various spurs diverged on all sides. Here to our chagrin we discovered, instead of beholding the Wairoo valley as we had anticipated, that another chain of mountains, as high and more abrupt than the blue range, and running nearly parallel to it, rose opposite us, at a direct distance of about 8 miles; but as there were several minor ranges which appeared of as impervious a nature as those we had just passed, with, at the end, nothing more than a bare possibility of there being a gorge through which we might descend into the Wairoo valley, in the event of not finding which we should be obliged to return, we held a council of war, or *kōrero*, as the natives would term it, as to the feasibility of our proceeding, when it was made manifest that, having hitherto procured but little game, and having been delayed by the ruggedness of the ground, our provisions had sustained a *pressure* not calculated upon, and on being brought into a joint stock it was clearly evident that we were at least six days short of what was absolutely necessary to the furtherance of our journey in the proposed direction. We had, however, satisfied ourselves as to one of the principal objects of our journey, viz., having ascertained that, although with some trouble and difficulty, a foot-path might be established by the route we had just traversed, it would be quite impossible to form a road. Having carried these propositions without a division, we surrendered ourselves to admire the prospect before us, and well alone did that repay our toil. Towards the N., the red tops of various ranges, broken by deep patches of green, fell away all at once into the Straits, appearing from our height about 5, but really 15 miles

off, which were in a state of the calmest repose, with now and then a momentary 'cat's-paw' flitting fretfully across their bosom. In the extreme distance, bearing N. by W., lay Separation Point; whilst Adele Island and the other islets along the coast slept like turtles basking in the noon-day sun. Before us lay range over range in twisted and distorted shapes, each overlapping each, till stern, gloomy, and impassable, rose the rugged chain bounding on the W. the long-sought Wairoo, from the lowest gorges of which a number of minor streams and water-courses (forming, as some of the party conjectured, the source of the Pelorus) ran towards the N. and E. Behind us lay the Waimea valley, and beyond that the Moutere and Motuska, the ranges separating which resembled, in the distance, from the heights on which we stood, a gentle undulating country. To the S., looking along behind the ridge of the blue range, the utmost possible variety of mountain scenery was visible."

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#### IV.—*Western Australia.*

THE efforts made to penetrate into the interior from this colony have been trifling compared with those made from New South Wales and South Australia. The subjoined journal of an excursion to the S.W. of York, undertaken by Messrs. Landor and Lefroy about the beginning of the present year, contains an indication which deserves to be followed up. A river coming from the W., about the 118th meridian E. of Greenwich, which appears to have been running at a more advanced period of the dry season than is generally the case with the rivers of that district, which had "a more water-worn" valley than other rivers, and which, where it was seen, flows through a country too arid to supply it with water, appears to indicate a high land in the direction of its sources. It is desirable that this track should be further explored. The journal of Messrs. Landor and Lefroy is in the form of a letter addressed to the editor of the *Inquirer*, a journal published at Perth, in Western Australia.

"SIR,—We send you the report of our expedition in search of the large inland sea, so often mentioned by the natives of the Hotham district. We took a native boy from York (Cowit) to shoot kangaroos, and to act as interpreter when our guides were unintelligible to us. We left York, with a packhorse carrying flour, tea, and sugar for one month, on the 9th of January, and, travelling along the Sound road 10 miles beyond the Dale barracks, we turned south-east into the bush to Corbidling, where we slept. The next day we went only 12 miles, to Nymbatilling, where we met our guides, Kouak and Quallet. They are excellent natives, ready at all times to carry firewood or game, or to do any other little office we required of them.

"We left Nymbatilling early in the morning of the 12th, and passed



over a good sheep country 10 miles to Millangolling, a pool in the bed of the Hotham, which we crossed. After leaving Millangolling, we passed over 15 miles of a very bad, scrubby country to Boiamuc, also a pool on the Hotham. The river here runs from south to north, while at Millangolling its course was exactly the reverse. In the bad country we saw one mound spring called Byring, which was situated in an ironstone country, mound springs being generally found in land of a superior description.

" Day's journey 25 miles ; course S.E.

" 13th.—It rained hard during last night, and until 4 o'clock in the afternoon. From 12 till 4 the rain came down harder than we remember to have seen it during the whole of last winter ; of course we were completely drenched, but a good waterproof bag protected our sugar and tea. Notwithstanding the rain, we left Boiamuc early, and, crossing the river, we went 10 miles over a bad and flat country. The country then began to improve, and at Carbal there is a pool of water, and a very good sheep country on all sides of the gully. Three miles from Carbal there is a fine fertile valley, with a large mound spring, which the natives called Yungameuing. We shortly crossed a ridge of hills, and descended into a long and broad valley of good feed, along which we travelled for two or three hours amidst most violent rain, to Narjaling, where we found three pools of good water, and excellent grass for our horses. The last 15 miles of this day's journey were over good land, which the natives said extended some days' journey to the east.

" Twenty-four miles, S.E.

" 14th.—Before leaving Narjaling this morning, we walked to a hill 2 miles distant east, and saw a great extent of grassy country, but no appearance of a river or any large water-course. We pursued our route to the lakes for the first 5 miles over good land ; then we came upon the ironstone, white gum country, occasionally varied by sand patches, with the red gum, and abundant plants of the well-known poison. After a 20 miles' ride, we crossed a large river flowing east, and 10 miles further we crossed another, or the same river flowing west ; the country very bad on both rivers. We here saw a party of natives, who told us the river was the Williams. Having already gone 35 miles, we wanted to stay for the night, but the natives assuring us the lakes were only a little way off, we were persuaded to urge our tired horses on. The little way turned out to be at least 12 miles, and that over a soft and boggy country, occasional grassy valleys, but the hills covered with poison. About sundown we saw Lake Byriering, perhaps two miles long by one and a half ; the water was fresh and excellent, but nowhere deep enough to cover the knees, for we walked all over it after the ducks, which were numberless. We were all tired, and intended to stay here on the next day, but as there was no grass for the horses, we were compelled to move to-morrow to Norring, only six miles distant.

" Day's journey 47 miles, S.E.

" 15th.—We moved to Norring, a large salt lake about 6 miles by 3, exceedingly shallow, with long, flat, mud shores. The country to the east and south is bad ; the northern and western sides of the lake are excellent. From a hill, high and grassy, on the north of the lake, we

had a fine view of the surrounding country to the east and south-east—long treeless plains of sand and scrub. At our feet was lake Quiliding, studded with islands in the most beautiful and varied forms. We never saw land and water so tastefully mingled.

“Day’s journey 6 miles, S.W.

“16th.—The lake seen from north-east to south-west (Norrington) was the westernmost we saw. Our explorations began where Mr. Harris’s ended. We could not persuade our native guides to take us east, so we were preparing to return, varying our route a little, when we fortunately met two other natives, who at once agreed to take us to the large lake to the eastward. After going 5 miles north we turned east, and came, in 3 miles, to Lake Barkiering. There is a good country on the western and northern sides of this lake, and the water only slightly brackish. We shortly passed another lake, 5 miles long, called by the natives Quilwhirring, quite salt. Here the valley of the lakes divides, one valley running north-east, the other east by south. We left the valley and proceeded due east, crossing a hill and a bad country; but we saw a grassy hill to the south. In 10 miles we again came down to the valley, and, passing two lakes, we encamped on a large sheet of fresh water called Goondering. This lake was fuller than any of the others, and had evidently been lately supplied, as the water was rising in it when we were there, and had already flowed among the swamp oaks around its margin. Our day’s journey was about 30 miles eastward. We had passed many lakes—first Norrington, where we slept; then Quiliding, Byriering, Quabing, Barkiering, Quilwhirring, and some others, to Goondering.

“Day’s journey 30 miles, E.

“17th.—We marched along the valley, which is too thickly timbered to afford any view of the country. After riding 8 or 10 miles, we came in sight of Dambeling, the largest of the lakes—15 miles by 7 or 8. It is, like the others, shallow, with many low islands in varied and beautiful forms. On the northern and eastern shores there is a good grassy country down to the lake, ending in precipitous banks, and extending over the hills two or three miles distant from the lake. The water is salt, and the shores long, flat, and muddy, on which we saw the impressions of two stray horses and a foal. We rode along the southern shore for 8 miles, when we crossed a peninsula, and again came to the shore of the lake. A few miles brought us to a river coming from the north, emptying into the lake. Its bed was equal to that of the Mackie at York. Salt-water pools, flooded gums and tea-trees, gave it the usual appearance of an Australian river. We called it the Lander. A mile beyond the river we came to fresh water, and encamped.

“Day’s journey 25 miles, E.

“18th.—We went due east for a few miles, when we fell in with a party of natives, one of whom accompanied us; but, after we had proceeded a short distance, the country became scrubby, without trees, sandy, and nearly level. In the foreground the scrub predominated, but the distance was a naked, sandy desert. The natives refused to take us into it, saying there was no water, and no feed for the horses, and that it was so hot no man could live there. We were obliged to turn north, and

soon crossed a large river at least 30 yards wide, pools full of fresh water, and a clayey bed. It had not ceased to run many days. We twice crossed the river, which appears to come from the east through the desert, and to empty itself into Lake Dambeling. We named it the Lefroy. The country on its banks is particularly bad. After turning north we passed over 5 or 6 miles of good country, and encamped on a pool of excellent water called Jualing.

"Day's journey 15 miles, first E., then N.N.W.

"19th.—Made a short journey to Wardaming, over a chequered country. Wardaming is a small pool in a gully, with good land about it. We here saw two Timor ponies, which joined our horses when feeding; one was a dark bay, the other lighter, and marked by a collar on both shoulders. We tried to catch them, but without success.

"15 miles, N.N.W.

"20th.—The ponies followed us a few miles. This day we crossed the worst country we had seen during the whole expedition. Whenever a rising hill gave us a view to the eastward we again saw the same endless desert, level and bounded only by the horizon. We crossed the north-east valley of the lakes, seeing the beds of two lakes, which were dry, with hard clay bottoms. Slept at Yaralmining.

"35 miles, N. by W.

"21st.—The whole day's journey was over a tolerable sheep country, badly watered, but a fair average feed, and plenty of poison. There is good water and excellent land at Yaral. Slept at Darapmining.

"29 miles, N.W.

"22nd.—This day we crossed the same kind of country to Warnup, a pool on a branch of the Hotham; we called it the Cowit.

"20 miles, W. by N.

"23rd.—12 miles, over a good country to Nymbatilling.

"Remarks.—The land we crossed over during this expedition was for the most part of a very wretched character; the only extensive tract of tolerable country being that crossed on our outward course at Carbal and Narjaling, which is no doubt continuous with the more easterly country we saw at Yaral and Darapmining on our return. There might be 50 miles or more between our two routes at those points. This country lies on the right bank of the Hotham, and on the small streams in which that river originates. There is no doubt a great area of this land, but its average character is far below the York district. Although many thousand acres of excellent land may doubtless be found, yet it will only be in patches, broken by much inferior land, which is infested with the poison.

"Throughout this country, until we arrived at the Cowit, there is no water for sheep; all flocks must be watered by wells or tanks. Between Narjaling and the Williams there was no land fit for any purpose whatever, and the country on either side of the Williams where we crossed it was particularly bad. From the river to the lakes the country was chequered, but the poison abundant. Were Lakes Quiliding and Norring fresh, there would be room for a few small flocks, but it perversely happens that the good land was on salt, while the bad abounded on the fresh-water lakes. To the east of Dambeling there is nothing but scrub



and naked sand extending as far as the eye can carry, being level, and bounded only by the horizon. It is most probable that this desert extends from the southern to the north-west coast, being probably the same sterile country seen by Mr. Roe and his party east of York, and from Mr. Eyre's account extending quite down to the sea on the south. The scanty plains are of two kinds, the detritus of granite being one, upon which grows the banksia and a thick scrub. The other kind is covered with the ferruginous sand called ironstone, but which is simply nodules of clay rounded by the action of water, and coloured and hardened by the peroxide of iron. This kind of country is the most barren. We nowhere saw the high granite ranges in which Mr. Harris conjectures the Williams to rise, nor do they, we are confident, exist. The country to the east of our homeward course is quite flat, and to the west they cannot be, or we should have seen them either going or returning. As we never saw either the Williams or Hotham on our return, we must have headed both those rivers. The Hotham rises in many small gullies in the good land we crossed, and is, like all the other rivers in this colony, a mere surface drain, flooded in heavy rains, but not supplied by any springs, and ceasing to run when the sun dries up the surface water. The Williams is the channel which conveys the surplus water of the north-east valley of the lakes to the sea, and is in wet seasons likely to run long before it drains away the water supplied by this chain of lakes, which in all likelihood extends far into the interior. We did not cross one single watercourse between Dambeling and Yarlmining, a distance of more than 50 miles. This remark more particularly applies to that part of the country sloping to the east, which was the most sterile we saw. In our opinion it is hopeless to look for good land east of the sources of those rivers which fall into the western ocean, at least until the desert is passed, when it is most likely the land will be too far from the settled parts of the colony, and divided by too terrible a barrier, ever to be available to this country. Though we cannot speak favourably of the land, we think that, in a geographical point of view, our discoveries may possess great interest.

"The general direction of the valley of the lakes is N.E. and S.W. We did not follow the valley to the S.W. below Norring, but it is probable that in heavy rains the accumulated waters of these lakes find an outlet by means of the Beaufort or the Gordon. There is no doubt the whole valley is one continuous stream in exceeding wet seasons, when all the lakes would be united, and present a truly magnificent appearance; but as the area of evaporation is so large, and the banks of many of the lakes high, the quantity of rain must be enormous before the valley can become a running river. Lake Barkiering, where the valley divides, has a very steep shore on the eastern side, about 15 feet above the present water-level, with three distinct marks of former water-levels. Between the present and the ancient shores there is a belt of swamp oaks and tea-trees. All the lakes have two shores, showing either a decrease of rain or an elevation of the land itself, probably both. Dambeling is by far the largest and most interesting of the lakes, and is the inland water so often mentioned by the natives, at least they have no knowledge of any other sheet of water more to the eastward. Many

streams flow into this lake, and with it terminates all appearance of a valley, unless the river Lefroy is a connexion with another distant and extensive reservoir. This river, in a geographical point of view, is an important discovery—the character of its bed, without trees, more water-worn than other rivers, its size, and the direction from which it flows, also the fact that it had been running so lately, render it exceedingly interesting to determine how it is supplied. The sandy nature of the country on its banks, and for many miles east, and the flatness of the country, preclude the idea that it received its supply from the immediately surrounding country. It must either be supplied by a country of better character far to the eastward, or it is the outlet of another and larger lake far in the interior. We are inclined to adopt the latter opinion, which is corroborated by an opinion of Colonel Gawler, who, in a late paper read to the Geographical Society, states his conviction that Lake Torrens is supplied by a much larger lake in the interior. It is probable that there is another outlet by the river Lefroy. From the natives we could learn nothing but that there were no kangaroos, no opossums, and no water, to the east; but, as their knowledge never extends more than 100 miles, their opinions are worthless. The north-east valley is narrower, and dry at this time of the year; probably less rain falls in it than in the other valley, for we found the one quite boggy and soft, while the other was baked and hard.

"The desert has a most repelling appearance, but it would be interesting to cross it at the proper season, which might be done by following the river Lefroy in the month of August.

"An expedition across the desert would require to be conducted upon a larger scale than any private individual would like to afford, and therefore can only be successfully done by the government. A few light carts and a well mounted party might usefully and extensively add to the geography of the interior, and would not be met by any insuperable difficulties, if a proper time of the year were chosen for its departure.

HENRY LANDOR.  
H. M. LEFROY."

*Perth, Feb. 2, 1843.*

#### *V.—Notes indicative of the Progress of Geographical Discovery.*

BOMBAY GEOGRAPHICAL SOCIETY.—Dr. Buist, secretary to the Geographical Society of Bombay, in a letter dated the 19th June, 1843, acknowledging the receipt of Vol. XII. of the Royal Geographical Society's Journal, writes as follows:—"The touching allusion of the president to the loss of Dr. Heddle, Sir Alexander Burnes, and Dr. Lord, all most active in their exertions to promote the objects of this Society, has greatly gratified the members. They request me to express their gratitude for the kind and prompt consideration with which permission was granted by your Society to have a copy taken of the portrait of Sir Alexander Burnes. . . .

"We have commenced reprinting the earlier numbers of our Transactions, which had been for some time out of print, a very small impression only having been originally thrown off. This enables us to carry on the paging all through, so as to make a volume fit for indexing, a precaution heretofore unhappily omitted. The London Society has never, I think, been supplied with our first issue ;\* at all events, whether it has or not, I shall not fail to forward copies of the new edition with its improvements.

"We have at the same time presently passing through the press our Transactions since 1841. The papers contained in this last fasciculus are very interesting. There are many valuable papers on Scinde, which our delay in publishing has enabled us to place together. These will now have additional interest from our recent conquest on the banks of the Indus, the value of which river for commercial purposes appears more clearly every day, the better we become acquainted with its capabilities, to have been exaggerated.

"I am in hopes that much light will soon be thrown on the geography of the east coast of Africa, on both sides of the line."

CENTRAL ASIA.—Dr. Wolff, who has generously volunteered to proceed to Bokhara, to learn the fate of Colonel Stoddart and Captain Conolly, offered before his departure to collect what geographical information he could for the Society. He was furnished with lists of the objects most worthy his attention.

EASTERN AFRICA AND ADEN.—(Extract : Letter from Captain Haines to Sir Charles Malcolm, dated Aden, June 2, 1843.) "By this mail Harris proceeds to England, to present to the Court [of Directors?] the specimens of natural history he has collected in Abyssinia ; to lay at her Majesty's feet return presents from the king of Shwa and Ifat ; and to superintend the publication of his work entitled 'Ethiopia as it is.' † If he can obtain permission from the authorities, it is his intention to return to Ethiopia. . . .

"Christopher has discovered a river without a name, to the northward of the Jub, traced it for 130 miles, and found that it increased in width and depth as he advanced. The natives assured him that it continued to do so for 400 miles further. He measured its breadth and depth, and found it to vary from 200 to 300 feet in breadth, and from 13 to 60 feet in depth. It is a clear, winding stream, with richly cultivated banks. Grain of all kinds was very cheap—jowari was 1 German dollar per 1360 lbs. The natives were civil and obliging. He has named it after me, which I am sorry for, as I prefer native names, and it must have a name already. Of course I have recommended both rivers to

\* A copy of it has been presented to the Society's library by Major Jervis.

† The title is now changed to 'The Highlands of Ethiopia.'



be examined, as I believe they unite inland, and join the Goshelb. I send a full report of 60 pages by this mail.

"You will be pleased to hear that Aden continues to increase, and that supplies of all kinds are plentiful; indeed, everything can be obtained. The population is now about 22,000, instead of 600, as in former times. . . . It is a busy, lively place. We have had as many as four steamers a month, and trees and gardens are springing up on all sides. The Parsis are certainly in advance of the government gardeners."

ABYSSINIA.—The Rev. W. H. Wayne wrote to the secretary on the 1st of September:—"Mr. Parkyns expected to find two friends at Massua early in May last. On the 21st of April he wrote from Jidda: 'I have always kept a regular journal, and of course shall continue to do so more regularly than ever. . . . With my friends I shall proceed to Gondar and southward through the Galla country in search of the sources of the white branch of the river Nile. We shall pass by the lake of Dembea, and the sources discovered by Bruce, on our way; and, if we meet with success, shall return in the course of two years to Gondar. My friends will return thence by the road we came, and I shall try the route by Darfur and the Niger. . . . I have made every preparation for a large collection of birds, beasts, insects, plants, and perhaps shells also. . . . I have taken with me all sorts of instruments and drawing materials.' Mr. Parkyns will from time to time communicate with the Geographical Society."

SYRIA.—Mr. Vigne, well known by his travels into Kashmir and Tibet, has started for Vienna, on his way to Syria. He intends to explore that country in the company of Baron Karl von Hügel, whose travels in Kashmir have attained a European reputation. The Royal Geographical Society has had much pleasure in assisting Mr. Vigne with the loan of some instruments.

TRIPOLI.—Mr. Consul Hammer Warrington, on the 25th of July, 1843, transmitted to the secretary a statistical notice of the Regency of Tripoli. In a letter which accompanied this valuable document the author states:—"I hope soon to be able to give you some geographical information respecting the interior, as we have now a vice-consul established at Murzuk, and I have instructed him to glean whatever may be interesting or useful. Nearly all Africa is open to us from this quarter; and not only is a most extensive trade available, but commerce and intercourse would better the condition of the natives and extend civilization. The axe being thus applied to the root of the tree of slavery, it would soon fall."

WESTERN AFRICA.—Mr. Becroft, whose name is familiar to all interested in African discovery, returned lately from the west

coast, after having ascended the Old Calabar river about 300 miles. He has again left this country to take possession of the governorship of Fernando Po, which has been conferred upon him by the Spanish government, with the rank of lieutenant in the Spanish navy. Mr. Becroft will be in every way useful in such a situation; and from his enterprising spirit we may fairly hope that his influence will be exerted in the cause of geographical discovery.

BUENOS AYRES.—Don J. Arenalis, writing to the secretary from this city, on the 15th of February, 1843:—"I see by your last letter that the council ordered the extracts from the *Mercurio Peruano*, which I forwarded, to be preserved in the archives of the R. G. S., and that they will be glad to receive a continuation of these extracts. This resolution does me great honour, and is perfectly satisfactory to me. I now inclose some more sheets of the work, and will continue to forward those which are to follow till the work is completed. I am highly pleased with your kindness in satisfying me as to the use made by the Society of the plans and geographical information communicated to it, and will take care in future to send you some papers of that kind."

SANDWICH ISLANDS.—General Miller, whose *Notes on South America* are contained in our Journal, has been appointed her Majesty's consul at the Sandwich Islands. He has taken his departure for the scene of his official duties, *via* Mexico; and has promised to send any observations that he may think useful or interesting to the Society.

SOUTH AUSTRALIA.—The Surveyor-General of this colony left Adelaide, on the 4th of July last, on an expedition of discovery to the north. He took with him six or seven men, to attend the drays and assist him in his operations. Several volunteers intended to join him. Governor Grey and his step-brother, Mr. Thomas, were of the party, but it was uncertain how far they intended to accompany it.\* The great object of the expedition was to explore the eastern and north-eastern shores of Lake Torrens. Circumstances might interfere to frustrate this; but at Adelaide, from the known abilities of the members of the expedition, and the completeness of its equipment, great results were anticipated.

NEW SOUTH WALES.—A neat and interesting map has been forwarded to this country by Mr. Benjamin Boyd, who sailed some time ago, in his yacht the *Wanderer*, to visit Australia. The map contains the result of surveys, by government officers and by the gentlemen on board the *Wanderer*, of Twofold Bay and the coast immediately to the N., and a route from the town of Boyd, on

\* As this is going to press we have learned the return of Governor Grey to headquarters.

Twofold Bay, to the W. base of Mount Kosciusko. The district W. of Twofold Bay, and S. of Mount Kosciusko, which is at present a blank on our maps, appears, from this document, to lie almost entirely within the drainage basin of a river which is formed by the confluence of a number of brooks rising along the Snowy Mountain range, and a low ridge which separates the basin from the E. coast; the main stream of which flows nearly from N. to S., and joins the sea between Cape Howe and Lake King, about two-thirds of the distance between those two points from the former.

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## PAPERS READ

BEFORE THE

## ROYAL GEOGRAPHICAL SOCIETY.

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I.—*Notes of a Journey through Texas and New Mexico, in the Years 1841 and 1842.* By THOMAS FALCONER, Esq., of the Honourable Society of Lincoln's Inn.

IN the following notes it is proposed to give the outline of a journey through Texas and New Mexico. They have no claim to scientific accuracy, for most of my papers, as well as those of my companions, especially some containing an estimate of each day's journey, and the bearings of the course followed, were, together with a collection of shells and minerals which I had made, taken possession of, with the baggage of my party, by the Mexican authorities in New Mexico. All that can be recorded is the general characteristics and condition of the country traversed, as indicating the peculiarities of some districts which may deserve examination when the pending contest between Texas and Mexico shall terminate, and a more pacific disposition among the Indian tribes of the north towards strangers than prevails at present shall permit it to be made.

I left Galveston for Houston March 12, 1841, in a steamer drawing about three and a half feet of water. The wind had been blowing hard, and "had blown the water out of the bay," so that we were unable to cross Red Fish Bar, on the N. of Galveston Bay. We grounded in about three and a quarter feet of water, and remained unable to move for upwards of twenty-four hours. On the morning of the 14th we passed Harrisburgh, situated at the side of Buffalo Bayou. This bayou is a narrow channel running into the bay, very winding in its course, and barely affording room for steamers to cross each other. The banks are several feet high, and were thickly covered with large magnolia trees. In many places we brushed against tall and pliant trees bending over from the banks, and sometimes fairly bore them down under the bows and bottom of our vessel. The channel is not free from obstacles, though it is easily practicable to remove them; and we passed the wrecks of two steamers, which

had been sunk by striking snags, or trees which had fallen into and were hidden by the water.

The city of Houston is at the highest and extreme point of Buffalo Bayou, which can be reached by boats of even the smallest size. It is situated on the edge of a prairie, and, with the exception of part of the main street, is at some elevation above the water of the Bayou. The houses are chiefly frame-built. Its population was estimated by the Board of Health as late as December, 1842, at between 2000 and 2500 persons, and probably barely exceeds the former number. Since 1838 its character has improved, and ferocity and ruffianism are boldly checked. The town was commenced in 1837, and has increased with remarkable rapidity. It is represented to be an unhealthy place, and during the first two years of the settlement certainly was so, though perhaps in a great measure in consequence of temporary causes. In 1839 the yellow fever for the first, and as yet the only time made its appearance. This occasioned the enforcement of many sanitary regulations and an improved system of drainage, which appear to have produced beneficial effects. In 1842 only forty-one persons died there, of whom nine were minors and nine were non-residents, many of the rest were persons of irregular habits. While I remained there many persons were suffering from fever and ague, but there were two causes why illness prevailed:—The wind blew from the E. and N.E., coming over the swamps of Louisiana; and among the trees, about half a mile off, are marshes, the proper drainage of which is neglected because they occasionally dry up.

The growth of the timber on the banks of the bayou does not extend far. The soil of the prairie is productive, but the natural vegetation is coarse. The trees were in leaf, and, I was told, that the season was as far advanced as at Richmond in Virginia in the month of May.

On March 23rd I left Houston, and reached Oyster Creek in the evening. Our road lay over an open prairie, with occasional clumps of trees, which, from their breaking the flatness and uniformity of the land horizon, are called "islands." We passed many large and shallow water-holes, or little lakes, the principal cause of fevers and agues in prairie settlements. These lakes were crowded with flocks of wild-geese and ducks, and there were some cranes. We also passed large herds of deer. The owner of the settlement at which we stopped spoke highly of the fertility of his land. In the first year, by merely scraping up the soil, he had obtained 50 bushels of maize corn per acre. The land cultivated for cotton had been very productive. It is not merely more fertile than the ordinary land of the United States, but the bowls of the cotton-plants burst earlier in the year, and the seasons are more favourable for gathering the crop.

At a distance of a few miles from Oyster Creek we reached the River Brazos. It was at this time low, the water of a reddish colour, running beneath steep and precipitous banks of red clay and sand, and the current strong and rapid. Bales of cotton are taken down this river; but I doubt if, at any time of the year, steamboats can ascend far up it from the sea.

On the W. side of the Brazos, at a short distance, we reached Richmond, apparently a thriving settlement. Crossing an open prairie, we came to the San Bernard, a small stream, which we easily forded. Lower down than where we crossed it are some fertile cane-lands. When these tracts are cleared the cane is burnt down, and the maize-seed sown by raking up the ground. As the young shoots of the cane-plants spring up, they are broken down, and the plants die in about two years. A shrub called a peach tree afterwards springs up, and is destroyed in the same manner. The land is then open for the plough.

Beyond the San Bernard the coarse vegetation of the eastern prairies ceased, and the country had the appearance of an extensive and clean pasture. We stopped in the evening at Peach Creek. There were large swamps in the neighbourhood, abounding, as usual, with flocks of wild-fowl. The district is very unhealthy, and even the negroes suffer much from sickness during the autumn.

From Peach Creek we crossed the country, in the language of the residents, to the timber of the Colorado bottom. One of the earliest settlements of the Anglo-Americans in Texas is in this bottom. It is called Egypt; and the land is of great fertility, but the settlers exhibited the prevalence of sickness in their sallow faces and feeble persons. The soil of the bottom is said to be above twenty feet deep. The cotton-seed was at this time being sown. If it is sown much later, the rains of this season are lost; and if much earlier, the plants are exposed to a "norther," which in 1839 blew as late as the first week of April. This wind always causes much injury to young plants, though it rarely continues more than three days at a time.

The river of the Colorado when we reached it (April 1st) was low. It did not differ in its character nor in the appearance of its banks from the Brazos. The growth of timber, chiefly oak, is principally on the E. side of both rivers: in the course I took, it was upwards of five miles in depth from the prairie to the river Colorado on this side, and not a quarter of a mile in depth on the W. side. I was shown some large bones of an animal which had been found in the bed of the river.

The road from the Colorado to Victoria is over a continuation of the same description of flat ground previously traversed, excepting a sandy district some miles in extent between the river



Garcite and the town. On the road, we forded the rivers Navidad, the La Vaca (generally called the Labaca), and the pretty river Garcite at a crossing near the ranche of De Leon, one of the first *empresarios* for the colonisation of the country. The water of these streams was clear.

The town of Guadalupe Victoria was incorporated by the Mexican government. It lies on the E. side of the river Guadalupe. The navigation of the river from the sea is prevented by a raft or deposit of trees. Linville is at present the port from whence this town, as well as that of San Antonio, derive their foreign supplies. Few Mexicans have resided here since 1836. The population does not exceed 500 persons; and the place is in bad repute from being the head-quarters of a party of robbers who had broken up a very important trade between this town and the Rio Grande.

At the distance of about six miles from Victoria we crossed the Rio Coleta, the banks of which for a considerable distance are of light white sand. We turned to the S.W. to Carlos's Rancho, or New La Bahia, a settlement on the San Antonio river, made by the Mexicans, who were driven from Goliad during the war. This settlement has been destroyed since I visited it by some men from Victoria who had no public authority for this cruel and most impolitic act. We met here with some of the few Indians who remain of the Tonkahua tribe.

Keeping a short distance from the river, we arrived, after a ride of a few hours, at Goliad, or La Bahia del Espiritu Santo. It was established as a military garrison in 1716, but was utterly destroyed in 1836. The fort is a square inclosure on the brow of a hill on the W. bank, and overlooking the river, the walls being pierced for musketry. On the W. side of it is a ravine, on the S. an open prairie, and towards the N. the ground slopes to the river. The church within the fort is a solid structure of stone, and bears the date 1801. The foreign supplies of the town were obtained from the port of Copano, and it was an important military position to the Mexicans upon this account. The population of the place before the war exceeded 1200 persons. An Irish family now occupied the ruined fort, and one Mexican family was living in a hut outside of the walls. On the E. side of the river are the ruins of an old mission.\*

\* General Filisola, in a pamphlet published in Mexico, gives the following itinerary:—

		Leagues.			Leagues.
From Matamoras to Frenito	.	7	From Salado to Santa Gertrudis	.	5
"	Colorado	7	"	Las Pintas	6
"	Carrisitos	6	"	San Patricio	6
"	Chiltipin	6	"	El Papilote	6
"	Jaboncillos	7	"	Las Rositas	6
"	Santa Rosa	7	"	Goliad	3=77
"	Salado	5			

The road from Goliad to San Antonio de Bexar runs near the river, and it is somewhat dangerous to travel over upon account of Indians. The first night we stopped at Minifree creek. The next day we crossed the Clito and remained at night near the Rio Cibolo. About 8 miles from the Cibolo and a few miles S. of the sulphur-springs, the surveyors find their compasses disturbed, the vibrations becoming sluggish. We again came to the river at the 18-mile ranche—here a rapid and narrow current running between limestone cliffs. The ground perceptibly rises from Goliad to Bexar, and from the road, before descending a low hill, you look over the town of Bexar—the four missions of La Espada, San Juan, San José, and Conception lying in the valley of the river to the left.

In this journey from Houston to San Antonio there was little variety in the appearance of the country. That there is an immense extent of land that will hereafter be profitably cultivated is beyond doubt: I think, however, that S. of a line running W. from Houston and bounded by a line running N. of Victoria, experience has proved the country to be unhealthy to Europeans, and on the settlements near the coast to be very fatal. Painful relations were also made to me of the frequent deaths of immigrants on the southern district of Trinity river—a part of the country which I have not visited. The western and northern districts I believe to be very healthy.

The town of San Antonio was founded in the year 1698, and is placed by Mexican authorities in long.  $98^{\circ} 30'$  W. of Greenwich, and lat.  $29^{\circ} 25'$  N. It is laid out with some regularity, the streets running at right angles to one another. It occupies chiefly a tongue of land swept by the river, and part of it is on the E. bank. There are two squares, called the civil and military, and between them is a stone-built church of the date A. D. 1717. The town was exceedingly well governed by an incorporated municipal body. The inhabitants were orderly; and I never knew any person to wear arms habitually, though, being on the frontier and subject to Indian incursions, it was always necessary to carry arms on leaving the town. Whilst I was in the neighbourhood some Comanche Indians galloped into one of the streets and killed a Mexican at the door of his own house. On the E. side of the river is the old mission and presidio, called the Alamo. It was similar in form and arrangement to the other missions in the neighbourhood: it was a square inclosure, presenting on the exterior a blank wall. This wall formed the back of houses opening into the square. The church and other buildings were ruined during an attack made by the President Santa Anna in 1836, when it was defended by some Texan troops.

The mission of Concepcion is a very large stone building, situated on the river about 2 miles below the town. The mission of San José is about 2 miles further down, and is remarkable for the very elaborate carvings of figures and flowers on the W. front of the church. The mission of San Juan is very inferior to the others, and that of La Espada is in ruins. Excepting in that of Concepcion, the houses within these missions are inhabited. These institutions were dependant on the Franciscan convent of Guadalupe, near Zacatecas.

The climate of Bexar is very healthy, and many of the old residents had attained a great age. There are no mosquitoes, the common plague of hot countries. Scorpions sometimes get into the houses. On one occasion a man sitting near me was bitten by one, but some hartshorn after a short delay was rubbed in, and no inconvenience followed from the wound.

There are no settlements on the Presidio road between San Antonio and the Rio Grande. I rode along it as far as the Laguna Espantosa in May, 1841. The river marked in the maps as the Leon was at this time nearly dry. A short distance beyond it is the valley of the Medina. The land on the banks of this river is covered with fine oak, cotton, pecan, and white-sycamore trees. We saw here some very large alligators. Before reaching the Rio Honda, which we found dry, we passed through an extensive wood of post or white oak. A few miles E. of the Rio Frio is a low ridge of hills, part of the side of which, to the right of the road, was broken away and exposed a bed of sand. This place is called the Loma Blanca. The Rio Frio is a fine stream, the banks of which are high and shelving, and were covered with trees. From hence is a dry sandy country until within a short distance of the Rio Leona. This river was not above 9 yards wide and between 4 and 5 feet deep. A little beyond, a sandy district again commences. From a hill called the Loma de Buena Vista (part of a continuous ridge running from the north), an extensive and arid plain is overlooked, reaching to the Nueces and forming a great part of what is often called "the desert between the Rio Grande and the Medina." It is not, however, barren, and is sprinkled with misquite trees. Having notice of a party of above 200 Mexican soldiers, chiefly militia, being in the neighbourhood, we left the road and went to the N.W. At the point at which we reached the Nueces the river ran between deep alluvial banks, and was not above a yard wide and a few inches deep. At a short distance from it were many masses of mica. We spent the greater part of a day on the banks of the Laguna Espantosa, a wide sheet of water, and then returned to Bexar by the direct route. The only part of the country on this



road, where it is possible to anticipate any extensive settlements, is in the fine valley of the Medina.

There was a considerable Mexican trade on the Presidio road, which was protected by the people of Bexar—by the Mexican government it was prohibited. I several times saw upwards of fifty pack-mules leave Bexar for the Rio Grande laden with manufactured goods.

In June I left Bexar for the city of Austin, at that time the seat of government, taking the old Nacogdoches road to the San Marcos. About 5 miles above Bexar we reached the springs, or the head waters of the San Antonio river. Their level is considerably raised by an embankment in order to enable the gardegas in Bexar and the lands about the city to be irrigated. We crossed the country to the Salado, a small stream, and stopped the first night at some water-holes in the bed of the Cibolo, a river which is said to sink in its course, and which a few days before and only a few miles to the S., I had seen running as a clear stream. The next day we crossed the Guadalupe, a broad, clear, and swift river, running over a hard white limestone bed, a great portion of which it did not at this time occupy. On its banks were some remarkably large pecan trees. From hence to the River San Marcos is an usually picturesque prairie, bounded on the W. by a low ridge of hills. The first branch of the San Marcos river, which we crossed, rises in a wood of oaks from the bottom of a lofty limestone hill, and soon becomes an important stream, so rapid and clear, that though it appeared perfectly shallow we could barely ford it. About a mile further on is the Rio Blanco, which runs over a white sandy bed and joins the San Marcos. Passing Plumb creek we stopped the third night at Manjack's spring, a fountain bubbling from a white-limestone rock. The next day we crossed Onion creek and turned off to Barton's springs, where the water flowing from below fills a natural basin 14 feet deep at the edge. There was a settlement here, and there were others between it and Austin. We descended a hill to the Colorado: at the bottom was a field of maize-corn, the plants being of luxuriant growth and some feet above us as we rode by them. We forded the river, and at a short distance arrived at the city of Austin.

\* Colonel Almonte gives the following itinerary from Bexar to the Rio Grande:—

	Leagues.		Leagues.
Bexar to the Leon . . . .	3	Nolodigas to the Arroyo de la Leona . .	3
" Potranca . . . .	3	" Loma de Bucua Vista . .	4½
" Rio Medina . . . .	1½	" Las Tortugas . . . .	1½
" Arroyo de Chacon . .	3	" Nueces . . . .	2
" Francisco Perez . .	2½	" Espantosa . . . .	1
" Arroyo de Tahuacomo .	3	" Arroyo de Peña . . .	3½
" Rio Frio . . . .	5	" La Rosita . . . .	3
" Arroyo de Nolodigas .	4	" Rio Bravo . . . .	6½ = 50.

This route was not free from danger : when returning by it to Bexar two men were shot by some Towaccanie Indians a short distance from us, one of whom was killed. On coming by it a second time to Austin, we surprised and drove off two Indians following one of our small party, who had separated himself from us in chasing some game.

The city of Austin lies on the left bank of the Colorado, on ground inclining to the river and at the base of some low hills. It is well laid out, and contains some excellent frame-built houses. On a hill to the W. of the main street, which runs direct to the river, is the Hall of the Legislature, inclosed by a stockade, and on a hill, on the opposite side, is the President's house. The public offices are a series of detached log-cabins on both sides of the main street. The city is on the extreme north-western frontier, and, though hardly established two years, presented a very flourishing appearance. It had greatly contributed to the protection of the eastern country, and had caused a large tract of land to be settled. I do not believe the statement that the Colorado is navigable from the sea to this point. The stone found here is not suited for building : it is a fine-grained white limestone of a very brittle nature.

At Austin I found an expedition on the point of starting for Santa Fé. I was not informed that "its object was to assert a jurisdiction" over a part of New Mexico, nor was this information communicated to the merchants who joined it, many of whom "ventured their all" in the expectation of being able to trade at Santa Fé.\* It was represented to be a purely mercantile enterprise, of which assurances of a friendly reception had been received, and this was the general opinion entertained of it. This representation was not improbable, for Mexican commissioners were in the country communicating with the government, and Mexican traders had long been received and protected at San Antonio. I was asked by the President, General Lamar, to join the party "as an invited guest, without being subject to military orders," and I accepted the proposal.

The expedition consisted of 304 men divided into six mounted companies, and with the exception of two companies of about ninety men, the arms of all were private property.† There were

\* Letter of the Secretary of State for Texas, April 23, 1842. Congressional Papers of the United States, 27th Congress, No. 271.

† "The circumstances of the country may repel the presumption of hostility, as well as the circumstances of the times or the manners of a particular age. The Texan expedition to Santa Fé, in traversing the vast plains between the place from which it set out and that point, was to pass through a region which no one thinks of entering or crossing without arms, for whatever purpose or with whatever intent he may undertake such an enterprise. If he be a hunter, he is armed ; if a trader, he is armed ; and usually traders go in considerable bodies that they may be the better able to defend

fourteen waggons laden with the goods of merchants, six waggons of the military companies, and two carrying the baggage of the staff and of the civilians. These were drawn by six or seven pair of oxen. There was one field-piece drawn by mules. The supplies for the maintenance of the party consisted of coffee, sugar, salt, dried beef, and a herd of about seventy cattle. The omission of some barrels of flour was an injudicious economy.

I left Austin upon the 17th of June, and joined the expedition which was then encamped at Brushy, about 12 miles off. About half way there was a grove of oak-trees, and a short distance beyond was an extensive plain divided by a long dark line of trees. The camp was among the trees. Close to it was a spring of water coming from a limestone rock, and on the edge of the basin below was a broken specimen of a very large ammonite.

It had been proposed that the route to be taken should be from the San Saba, or on the course of the Colorado to the Puerco, and along the line of this river to San Miguel. It was, however, determined to proceed, if practicable, to the Red River, and, after crossing it, to get upon the Missouri trail to Santa Fé. When we reached New Mexico, we were told that the former would have been the best route.

We left Brushy upon the 19th. The observation frequently made that a flood must have passed over the prairie we were crossing, conveys, though very imperfectly, what many imagined would be the condition of land after a vast sheet of water has run off it. In the evening we reached the San Gabrielle, the bed of which was a compact white limestone.

On the 24th we reached Opossum Creek, the bed of a wide and at this time shallow stream. It was in the course of this or the next day's journey that we found dispersed over the prairie for several miles small pieces of iron ore, generally angular in their fracture, though many were somewhat round; the largest not above an ounce in weight. A handful could be collected in a circle of about 5 feet. Some of the men stated that they had observed the same thing in the district about the head of the San Saba river. In the evening we camped at Deep Creek. The banks are about 12 feet high, of loose scaly clay, and throughout their whole depth was a bed of shells, chiefly of oysters and of a

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themselves against the roaming savage tribes so constantly met with on those extensive plains. It is not uncommon, indeed, that for their better defence, companies of traders retain the services of men at arms, who maintain military order and array along the line of their march. When such bodies are met with in countries usually traversed by them, no inference arises, from the circumstance of their being armed, of any intention on their part of using such arms for any purpose but that of defence. If tourists, or persons wearing any other similar but equally pacific character, set forth on such a journey, they are still armed—armed for subsistence as well as defence."—*Letter of the Hon. Daniel Webster, April 5, 1842, Congressional Papers, 27th Congress.*



species of large shell, the probable name of which is not suggested by any shell that I have seen.

The next day we passed some dry gullies in which was a large quantity of the same kind of shells as in Deep Creek. We met this day with vast herds of buffaloes. They covered the prairie like a black cloud, and their number could hardly be exaggerated. In the afternoon we reached the San Andreas or Little River. On the bank I found a fine specimen of a large nautilus. We remained on this river some days in order to repair the waggons. On starting again, a journey of four days brought us to the Bosque River. The country was open, and we had no difficulty in finding water. Wherever the rock was visible, it was a compact limestone.

Beyond the Bosque River was a somewhat broken country. A few miles from it we reached a valley into which we descended by a natural terrace which passed along the side of the hill, and enabled the waggons to be brought so easily to the bottom, that the drivers exclaimed "that it must have been made by men." The sides of this valley were swept by two streams which united at the east side. The beds of both these streams were a conglomerate of shells of the gryphæa species and of lime, and on the banks layers of these shells were exposed. We continued to find these shells during 2 days' march from this place.

On the 11th of July we were in sight of Comanche peak. It is a long, flat-topped or table mountain, apparently rising from a plain. Its size and breadth from the time we saw it on the W. and S. sides, and again on the E. did not perceptibly vary. Soon after being in sight of it, we came near several conical-shaped hills and others similar in shape to the peak. They were not very high, and soon ceased to be seen.

We reached the Brazos upon the 11th of July, halting at a fresh-water spring about a quarter of a mile from it. The bed of the river was of considerable breadth, though the stream was only a few yards wide and a few inches deep. The water was clear, but very brackish. In some holes many large cat-fish were caught. We crossed the river upon the 13th. A few yards above its level a large portion of a fossil tree was found. The statement on some of the maps of Texas, of a petrified forest, is most probably an idle story, arising from some party having met with a fossil specimen of this kind. There was an ascent from the river for about two miles, and from high ground was a fine prospect—the Comanche Peak rising on the horizon to the W., the country on this side of it appearing a flat wooded plain, and a little to the N. the Brazos river made a great bend. From this point our course was as far as practicable to the N.W.

We passed several streams, and on the third day after leaving

the river came to a large spring of water rising out of a conglomerate of lime and shells of the *gryphæa* species. The water fell over a ledge of this conglomerate about 5 feet high. In some gullies near I picked up many specimens of small echini.

On the 19th we crossed the ridge dividing Noland's river and the Trinity. On the 21st we entered part of the line of oaks running from the N., called the upper cross-timbers, and brought the waggons through it with great difficulty on the 31st. Some lunar observations, which I cannot say are to be relied on, made our position on the 27th in long.  $97^{\circ} 44'$  W. of Greenwich, and lat.  $33^{\circ} 35'$ . We had found honey in many trees for some days; but, according to the statement of old hunters, bees are not met with W. of the cross-timbers. On getting clear of the forest, we found the trail of a trading expedition, made two years previously under the guidance of Mr. Connelly, direct from the Red River across the Puerco to Chihuahua. He had discovered the error of carrying goods to Santa Fé; and, after overcoming immense difficulties, finally arrived at the central market of the N. of Mexico.

On the 4th of August we came to a large red river. Some Wakoe Indians met us, and seemed disposed to enter into communication with an advance party, but they fled in great haste when they discovered our number. On the northern side of the river, upon a flat piece of ground, was the Indian village, very prettily laid out, and the huts covered with the leaves of the maize corn. Strict orders were given that no person should pass over to it, and sentries were set to see them executed. Some men, however, got into a patch of water-melons, then unripe, and brought some of them into camp. The next morning we crossed the river, which we supposed to be the Wishetaw: it was of a deep red colour from the quantity of mud suspended in it. It was evidently subjected to very high floods, though it was this time not above  $2\frac{1}{2}$  feet deep at the crossing. We were compelled to pass through the village; but the Indians had abandoned it, and all the corn in a large plantation had been gathered. No injury was done to the huts; and the taking of the melons was the only wrong committed.

From this point we were compelled to keep off to the W.; and on the 5th we halted at the side of a lake of red-coloured water, the sand about it being of a deep red colour. Keeping still W. we again struck the river on the 5th. On this day Mr. Van Ness, who rode with a party to the N., reported having reached a river of considerable size running E.

On the 7th we stopped at a small fresh-water stream; and on the 8th we reached the Wishetaw again, or a branch of it, and crossed it to the S. side. On the 8th and 9th we had great diffi-

culty in getting through gullies and ravines, but were able to camp where our cattle had sufficient pasture.

It was now supposed that we were close to the Red River, and nearer to Santa Fé than some calculations made it. Three men were therefore sent off, on the 11th of August, to reach a spot well known to the Santa Fé traders, called the Angosturas, or Narrows. From thence they could easily reach San Miguel, and were ordered to send guides to us.

By keeping far out to the S., to head the ravines, we found a flat prairie and an easy road. Our course was kept to the S. and S.W. during the 12th and 13th: on the latter day we came to the edge of a valley on the N., about two miles wide, furrowed with ravines of immense depth, at the bottom of which we found many small springs of water. An examination of the valley was prevented by the long grass, in which we injudiciously halted, having caught fire by an accident. The flames spread with wonderful rapidity, and in a few moments two of our waggons were on fire, one of the tents was burnt up, and the other waggons were barely saved. The fire spread to the cedars and the brushwood of the ravines, and in a short time the whole valley seemed to be covered with flame. The next morning everything looked withered, black and charred, and the fire was still spreading along the valley to the N.E. The wind fortunately blew in the direction contrary to our course.

On the 14th, keeping along the edge of the valley to the W., we came to a point where, what had appeared to be a portion of the opposite side, was found to be merely a continuation of that on which we were in a different direction. At the angle, the elevated ground separating what I believe to have been part of the valley of the Red River from that of another drainage-basin, narrowed so much as barely to leave a passage sufficient for the waggons to be taken across. The stream, therefore, running through the valley did not come from the W. At this crossing we could see to our left broken ground and ravines similar to those on our right; and in this district to our left we believed the head waters of the Brazos to have their rise.

Having brought over the waggons, we bent to the W. and N.W., and came again to the edge of the valley to our right, I descended into it and rode across part of it. There were many dry beds of broad torrents, and I at last reached a small stream, the water of which was very salt, and we could obtain no other to drink. On both sides of the banks of this stream were continuous strata of fibrous gypsum.

On the 15th we passed a red sandstone district, and were again compelled to go to the S. and S.W. We were then obliged to stop for three days close to a large spring of water, very clear and



bright as it flowed from the ground, but, soon after exposure, nauseous and bitter. I was one of a very few whom it did not affect, almost all our party suffering from sickness and diarrhoea in consequence of drinking it.

On the 21st we were heartily glad to move. We ascended a very steep side of a hill near us, and came to perhaps the first true range of table-land. The ground was flat, and sprinkled with misquite trees, and there was excellent pasture for the cattle. For four days we continued to traverse it to the N.W. Throughout the whole distance was an almost endless "dog village," or mounds at the mouths of the burrows of the prairie-dog, a species of marmot. The water-holes filled by some late rains, and some fresh-water streams running E., greatly aided our progress. On the fourth day we reached a district of fine white sand covered with dwarf oaks from 1 to 3 feet high, bounded on the N. by a bright stream of fresh water. On the 24th it was estimated that our latitude was  $34^{\circ} 20'$  and longitude  $101^{\circ} 25'$  W. of Greenwich, but I do not think the observations were correct.

On the 25th of August, after proceeding a short distance, we came to a salt stream, and were unable to bring the waggons across the ravines until near sunset. On the 26th, after getting over a few miles of rugged ground, we again ascended on another range of table-land. On reaching it, the scene changed. From dark and gloomy gullies, sandy ravines, and stunted cedars, through which we had been struggling, there was suddenly before us a fine green pasture, a flat prairie, with misquite-trees, and a most cheerful prospect. On the second day we passed a very wide white sandy bed of a stream then dry; and on the fourth day reached a river running E., which the Mexicans subsequently told us was the Quintufue, a branch of the Palo Duro, and a tributary of the Red River, having made about 70 miles N.W. on this level. Here we disturbed the camp of a very large body of Caygua Indians. We did not see them until they had removed, and fruitlessly endeavoured to enter into communication with them.

On the 29th, at the distance of about six miles from the river, we came to a precipitous edge of the table-land. On our left was a lofty escarpment of a level line of high ground. On the 30th we were compelled to return to the river. This day some Indians cut off and killed five of our party; among them a young Englishman, the only son of Major-General Trevor Hull. Some Mexicans, who afterwards fell in with the Indians, told us that our men in defending themselves had killed a chief and several Indians; but they had carried off their dead before we could reach the bodies of our companions.

Our provisions were at this time nearly exhausted. We had no salt, sugar, or coffee; and were reduced to a pound and a half per

man, bones included, of lean beef. In this emergency it was determined that ninety men should be sent forward to San Miguel for provisions and guides, and they left us on the evening of the 31st. The Indians having stolen my horse a few days before, I was obliged to remain with the party on the Quintufue.

The party that left us took a route different from that subsequently taken by us; and I am indebted to Mr. Kendall, who accompanied it, for the following account of their journey:—

The high ground to the left turned out to be "the grand prairie," the most extensive table-land of the N. of Mexico. They traversed it in a N.W. course, and estimated the distance to be nearly 200 miles. Before they descended from it they saw a chain of mountains running nearly N. and S., and believed they looked on its southerly termination. In the country towards the N. there appeared to be a river of considerable size. On descending from the table-land they reached some very rugged ground, and were compelled to go W. and S.W. After crossing several hills they reached a small stream of water; they then reached a river, which they believed to be Red River; but it is very doubtful if either party saw the main stream of this river: it probably bends suddenly to the N. in a very different direction from that indicated in any of the maps. Some 10 miles to the S. were some remarkably-shaped mountains known by the name of the "Crows." After wandering among the mountains, they unexpectedly discovered the Angosturas, which the Mexicans had described to be in the neighbourhood of the "Crows." The road was along the rough ledges of a rock running for nearly 8 miles between mountains, varying from a quarter to three-quarters of a mile in distance from each other. The direction of these mountains is nearly E. and W. The river was to the right. About sun-down of September 12th, they reached a point where the river suddenly turned off to the N. To the W. was a valley 3 or 4 miles in width, apparently very fertile. For some time the party had been reduced to very great distress for want of food, and had killed one of their horses for subsistence. Here they fortunately fell in with some Mexicans who had been trading with the Indians; three of them agreed to accompany one of the party back to the river Quintufue, in order to act as guides, and started without unnecessary delay. The Mexicans met with were on their way to the river Moros, and called the distance to San Miguel between 70 and 80 miles. They kept in company one day on a W. course, and left for their homes to the N.W. The party, continuing their route W., came to the Galenas, where they were all able to purchase sheep. On their road from this place to San Miguel five of the men who were in advance of the rest were met by a body of Mexican soldiers: they were taken pri-



soners to San Miguel, where, soon after their arrival, two of the men who had left us on the 11th of August were, without being allowed any communication with them, brought before them into the square and shot. The third man, who left us the same day, was killed when his companions were taken. One of this advance party—an American, who had lived some years at Chihuahua—offered his services to General Armijo, the Governor of New Mexico, and joined the Mexican troops, who were preparing to attack those of his own party. He found the Texans at Anthon Chico, and advancing with the Mexicans, described the reception of his companions to have been very friendly, and went through the form of a masonic oath with some freemasons of the company to secure confidence in his statement. The leaders were wonderfully credulous, and, placing the men in the power of the Mexicans, they all became prisoners. Had they maintained their position and communicated to us the hostile spirit they had discovered in the country, which might have been practicable, we should have endeavoured to have made our way back to Texas.

After the party whose capture was thus effected had left us on the Quintufue, we moved higher up the river, occasionally changing our position to secure pasture for the cattle near the camp. The Indians kept about us and caused frequent alarms. On the 4th of September, between 8 and 9 o'clock in the morning, they effected an "*estampido*." They killed and scalped one of our men and in a few minutes drove off our cattle and eighty-three of our horses. The cattle we fortunately recovered back, but the loss of the horses was a great misfortune. On another occasion, in the middle of the day, they speared one of the sentries. Between the time indeed that we first reached this river and the day we left it, we lost thirteen men, only one of whom died from disease, the rest being killed by Indians.

On the 17th of September the Mexican guides sent to us from the Angosturas arrived. The next day our encampment was broken up, many things were destroyed, and having been compelled to live upon the draught oxen, five waggons were abandoned. The men, at this time, were in a feeble and languid state; scratches on their hands ulcerated, and it seemed as if the scurvy was about to appear among us.

Our first day's march was to the base of the escarpment of the grand prairie, at the side of the Arroyo Atuley. On the morning of the 19th we brought the waggons by an easy ascent upon this remarkably extensive table-land. The few openings which afford places for ascent or descent, are called by the Mexicans "*puertas*." Upon the edge of this land, the whole extent of the table-land beneath, upon which we had remained so many days, appeared as a map before us, with the white lines of the sandy bed of the



river and of its branches clearly marked, and misquite trees dotted upon the plain.

The appearance of the grand prairie is that of a flat plain. The pasturage for the cattle was excellent, and the grass as green as if the season was that of spring. But it is remarkable that, excepting in the bed of a river and in some gullies, there was not a tree or a shrub on the prairie. On the 21st we crossed a broad gully. On the 23rd we reached the Río Escaravedra (*escarbadura*, scraping). The Mexicans stated that, when the stream did not run, water was obtained in the channel by scraping or digging up the ground. It lay in a broad chasm about 100 feet below the level of the prairie; but at this time there were only water-holes in it. The guides appeared to know the country accurately: they followed no trail, there was no tree or mark before them, and yet from morning to night they did not vary from the course they proposed to take. If at the end of the day a mere water-hole was to be the camping-place, they carried us directly to it. To-day they brought us to what was no doubt a very important point. On a sudden we came upon a well-worn road, bearing down to the river, formed by the tracks or trails of buffaloes and Indian and Mexican hunting-parties: we descended it, and crossed to the left bank, continuing during the day along the side of the river. Coming upon the relics of a broken Mexican waggon, there was an extravagant expression of joy: it was not then known how far from the settlements even the Mexicans will drive their waggons. Before getting out of the chasm and reaching the prairie, the Indians cut off two of our men. Our course was kept westerly and near to the line of the river, sometimes camping on it at night, and other times halting at lagunes on the prairies, where were frequently flocks of wild ducks. Some few antelopes were killed. It was not the buffalo season, and we saw none, but there were signs of immense herds having traversed the country. On the 27th there was no water at the almost north-westerly point of the bed of the river: this the guides had warned us to expect. On the 28th we failed in reaching a *puerta*, or place of descent, until after it was dark. It was necessary to press forward for water, and we brought down the waggons with great difficulty and camped at a water-hole. During the nine days that we were on the table-land we travelled at the very least 170 miles.

On the 29th we kept along the northern escarpment of the grand prairie to the Arroyo de Abajo. On the 30th, near the north-westerly point of this prairie, we stopped at the Monte Revuelto (mixed wood). The guides stated that in the spring they had driven sheep from San Miguel to this point for the purpose of grazing. The district abounded in a low cactus, which they called the organon, very different from the tall plant of that name which

grows in the valley of Mexico. On the 1st of October we halted at the Arroyo de Monte Revuelto. We had, when on the grand prairie, sent forward a party to San Miguel to ascertain why the provisions promised, when the guides were sent to us, had not arrived. At this place we sent off another party on the same errand. On the 3rd we passed the *Boca*, which I suspect is a southern pass of the same line of mountains which are crossed to the N. at the Angosturas. We here saw the fresh sign of horse-men and mocassin tracks: the guides were alarmed and could not explain it. In the evening we stopped at the Arroyo de Tuncarrie. To the W. was a long flat-topped mountain, and a conical-shaped mountain at each side of it: there was also a range of mountains to our right.

On the 4th we reached the high grounds which divide the streams running to the Red River and those running to the Puerco. The first of the streams running to the Puerco that we came to was at the Laguna Colorada: it was situated in a sandy plain lying between an escarpment of hills. Among the sand was a large quantity of cedar-wood brought down by floods from the N. The guides said it would be 5 days' journey from this place to San Miguel: to Parajito, one day; El Cuervo, the second; Los Esterros and Rio Galena, the third; Ticoloti, the fourth; Los Huevos de Vernal and San Miguel, the fifth.

At this place, however, we were stopped by a large body of Mexican troops: they were encamped behind some rising ground, on the road, having a high ridge of rocks nearly perpendicular on their left and the lake on their right. Our men were at this time in a very distressed state; we had only fifty rounds of cartridges to a man made up, and powder for about as many more; our most efficient men and best horses were with the first division, of whose fate we knew nothing; many men were sick and infirm, and nearly all our horses had been carried off by the Indians. Retreat was impossible, for we had not the means to protect our cattle from being cut off by cavalry; and the possible success of one day would not have enabled us to advance, nor to have carried away our wounded if we retreated. A surrender was agreed upon, and the terms, securing to the party the treatment of prisoners of war, were signed by the officers on both sides. On October the 5th the Mexicans took possession of our arms, baggage, and the merchandize. On going over to their camp there was a very large body of troops drawn up, and soon afterwards a reinforcement of 150 men, very well armed and mounted—many having the muskets and pistols of our advance division—arrived.

On the 6th our road was bounded on both sides by a ridge of mountains, and after crossing a hill covered with cedars, we came to a spot called Parajito at the bank of a stream. From hence

there was an open road to El Cuervo, a bend of a stream, near which is a red-coloured conical-shaped mountain. I rode much in advance of the main body of troops and prisoners, and it was dark before I got to Los Esterros. We started in the morning of the 8th before sunrise, and at an early hour reached a hill above the river Galenas. At this place General Arinjo, the governor of New Mexico, was encamped. A large body of troops were under arms, with some artillery. The road for the greater part of the remainder of the day was over a plain, and in the evening we came to a settlement on the Puerco called Anthon Chico. In the neighbourhood there were large flocks of sheep. The heads of the maize here, as well as in other places in New Mexico, were remarkably large.

On the 9th we crossed and re-crossed the Puerco, passing through a very hilly country, and to the N. was a range of lofty mountains. We again reached the Puerco, in a *cañada*, or valley, called Cuesta: there was a pretty settlement here, and the fields were enclosed and subject to irrigation. From hence, winding through a mountainous country, cultivated wherever it was practicable, we followed the course of the river, and in the evening arrived at the large town of San Miguel. This town and the neighbourhood contain probably 2000 persons: there is a square in the centre of the town, and a church on the N. side.

We remained at San Miguel until the 17th: the main body of our party having arrived on the 12th. They had been harshly treated after we had left them: they had been stripped of their coats and waistcoats; their second blankets had been taken away: for nearly two days they were tied, and many thought that they were to be shot. Shortly after their arrival much of the merchandize seized was distributed in the square among the soldiers and Indians.

We were here joined by Mr. Kendall and those who were taken in advance of the first division, and by two parties which we had sent forward after we reached the grand prairie, and which had been captured soon after they had left us. The main body of the first division had already marched for the city of Mexico.

Our first day's journey from San Miguel was through the mountains: the country was well wooded, but there was no settlement on the road. At sunset we stopped at an old Indian settlement called Pagos, situated on the brow of a hill above the river: it is a walled enclosure, in which a few persons lived; but the houses within were made more ruinous than on our arrival, by the Mexican soldiers, who made fires of the materials.

On the morning of the 18th the high and bold mountains above Santa Fé lay to the N., and the peaks were covered with snow. We went W. over a tolerably open country to a fine ranche, or farm, called Galisteo, belonging to one Pinos, whose name on



some maps is, I suspect, intended to mark this place. The stream here runs to the Rio Grande, and we camped the next day in a field on the bank of it.

On the 21st, after passing two pretty towns—San Domingo and San Phelippe—we halted on the Rio Grande at the poor village of Algodonez, situated on a plain extending some distance to the river. On the 21st we passed Zandia (water-melon), an Indian village. The Indians brought out a large number of melons and distributed them among the men. They were of short stature, as all the Indians we met with in Mexico were, and their dwellings were laid out irregularly, with the same neglect of comfort and cleanliness which is to be observed in the settlements of the red race among civilized nations. The Rio Grande, even at this distance N., is very broad, running over a bed of red sand, but very shallow. We stopped in the evening at a pretty village named Almeida.

During the 22nd we passed a succession of houses. The people here, as indeed at all the settlements on the Rio Grande, exhibited much good feeling, and brought out presents of corn, meat, tortillas, cakes, and eggs. Albuquerque, the largest and most populous place that we saw upon this river, contains a large farming establishment, the buildings of which were in good order. We merely passed through the town, and stopped at Los Placeres, a small village a few miles farther on. We were here told that over the mountains to our left were several villages on the Puerco, the largest called San Antonio.

On the 23rd we travelled over a well-wooded country, and passed many settlements, stopping at Valencia, in the neighbourhood of which is an extensive irrigated pasture. One of our men died the next morning from exhaustion and fatigue; and we had not proceeded far when some of the guard were sent to the rear and shot one of the men who was lame and could with difficulty walk. We had two of our own waggons with us, in one of which he might have been permitted to rest himself, and there was nothing to justify the act. The ears of these men were cut off to be kept by our captain, as evidence that the men had not escaped. On the road from Valencia is a very sandy district, some high mountains lying on the left. On the right bank of the river were two large Indian villages: a low range of mountains were to be seen on that side. The left bank of the river here became very elevated, and we stopped on the 24th upon a plain much above the level of the river at the Casa Colorada. This building was a collection of about twenty houses, connected with a large farming establishment. From hence to Joia is a very sandy district. On this part of the road we passed a long train of waggons drawn by mules belonging to a Mr. M'Guffin: they were on their way to

Chihuahua, and had been brought from St. Louis on the Mississippi. Joia is one of the largest villages on the river, and the population is numerous.

A short distance from Joia, the Rio Grande is greatly contracted in its usual breadth in its passage between some low hills; it was indeed so narrow as to create for a time a doubt whether it was the river we had left when we turned off from it near the Casa Colorada. We did not continue long on the bank, our course being to the left of some mountains lying between the river and the road, through a red sandy country abounding in dry water-holes, in which were considerable quantities of crystallized salt. We halted in the evening (the 26th) at Pareida, again striking the river. This is the last settlement on the left bank between Santa Fé and Paso del Norte. At Pareida is the commencement of a great bend of the river to the E.: and in order to shorten our road we crossed the water, about 2 feet deep, the greater number of our party wading through it. On the opposite side was a wood of cotton-trees of large growth, and on the S.W. of a level plain, apparently of very good land, we came, at the distance of about 6 miles from the river, to the village of Socorro, the central point of the range of the Apache Indians, several of whom rode into the village armed with American rifles. The houses are built with flat roofs after the Mexican fashion; and in the windows, instead of glass, were thin and broad pieces of mica. The population speak Spanish, though of mixed and chiefly of Indian blood, in common with all the Mexican population of the north.

On the 28th the road was along a flat country, at the bottom of a ridge of mountains lying to our right. We passed a grove of oak-trees to our left, called the Bosque de los Apaches, and camped at the Valle Verde, a continuation of the same wood. On the 29th we crossed the river, which here bends far to the W., striking it again at a camping-place called Fray Cristoval. At this point the river again bends to the W. During this day a violent N. wind blew, and at night there was a fall of about 2 inches of snow. As we none of us had more than one blanket in addition to our light clothing, and many no blanket at all, we suffered much from the cold. At this point is the commencement of what is called the *grand jornada* (great journey), across the country to where the river is again met with. We moved off at noon on the 31st, and our march continued during the whole night. In the morning we halted for about an hour and a half, when the march recommenced, and was continued throughout the day until sunset. We rested for about three hours, and then moved on, during a second night, until about ten o'clock the next morning, to a spot called Roblado, opposite a high precipitous

mountain, round the E. side of which the river turns in its course to the S. During this time we had no provisions or water. In some parts of the road there were shrubby trees, but generally the country was open and barren. After resting a few hours, we proceeded about 5 miles farther, to obtain pasture for the cattle. In this long march two men were killed: they were exhausted and unable to walk, and one of them, named Golphin, had lost the use of his right hand, and had been carried in a waggon for nearly two months.\*

On November 3rd we continued our march over an irregular country lightly wooded, and stopped close to the river. Here another of our men died. Early upon the 4th we reached *the pass*. The road traversed the mountains in every direction for several miles. These mountains appeared to run from the N.E., to the river, and then to extend westerly. We crossed the Rio Grande del Norte near an embankment made to raise the level of the water above it: it was not deep, but the current was very swift, and the men waded through it as they had done on the two former occasions. Our road was along the side of the canal connected with the embankment, by means of which the country is irrigated. At the distance of about a mile from the crossing of the river we entered the town of Paso. It is a place of some size, with many good houses; the gardens are enclosed, and the vine is extensively cultivated. The inhabitants carry on a great trade in wine, raisins, and other dried fruits. At present there are few cattle or horses in the neighbourhood; formerly they were numerous, but the Apache Indians, who are at peace with the inhabitants of New Mexico, have long kept up a war with the people of Paso and of the south, and have swept away their stock.

At Paso we met with a kind and generous reception. The greater number of the men were broken down by lameness and fatigue; many were almost naked, and others were suffering from sickness. Immediately on their arrival everything in the power of the commandant, Colonel D. José Maria Elias, was done to relieve them, and assurances were given of their personal safety. In his honourable and humane treatment of the party he was actively aided by the good priest Raymon Orthez.

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\* It is but just to state the opinion of some Mexicans respecting these acts. The 'El Siglo,' XIX., published in Mexico, alluded to them thus:—"Captain D. Demasio Salazar had the iniquity to kill three persons in cold blood, because they had become wearied. It was reserved for Salazar to eclipse the triumph of Señor Armijo by this cruel and brutal action. Every one is indignant at such an atrocious act, peculiar only to savages. Don José Maria Elias, colonel of the army and commandant at Paso del Norte, is preferring charges against this barbarous captain; and Señor Conde, governor of the department (of Chihuahua), is mortified by an event which does so little honour to Mexicans."



We did not leave Paso until the 9th. We took with us numerous waggons for our infirm and sick, and were well supplied with provisions; we were also the escort of a lady and her family travelling to Chihuahua, as well as of traders in charge of a large number of pack-mules laden with barrels of Paso wines and crates of large onions.

S. of Paso is an extensive flat country, the Rio Grande running through it to the S.E. We carried with us casks of water for the next day, and stopped on the 10th in a barren district. On the 11th we came to a water-hole of not very good water, called Ojo Samaluka (Colonel Pike names it Ogo-mal-a-Ukap). Here we remained the whole of the 12th, to enable half the waggons to be carried on by double teams over the Arenales. On the 13th, the oxen having returned, we accompanied the remainder of the waggons. This remarkable district, called the Arenales, is about six miles across, and extended as far as we could see to our right and left. It is a series of high round or dome-shaped sand-hills of fine white sand. We halted in the evening at an opening between some hills, called the Puerta de la Piedra. There were two large mountains on each side of us, the one called Candelera, and the other Rancheria. On the 14th the Sierra de Carazal ran to the right, and in a barren country we stopped at a hole of bad water, called the Ojo de Lucero. About the middle of the Sierra de Carazal is a singular flat-topped mountain, the highest of the range, called the Banquete de Lucero. On the 15th we reached the Ojo Caliente, a spring of warm water flowing up through a bed of white sand. On the 16th we passed the Presidio de Carazal. In common with other places, it has suffered much from Indian depredations: formerly there were large herds of cattle in the neighbourhood. On the 17th we camped at a stream of water connected with a hot spring rising about a mile to the right of the road. On the 18th we again camped without water.

All this country from Paso appeared to be very barren; and, except at Carazal, there was no settlement on the road. We now came into a plain bounded on both sides with a long range of mountains. On the evening of the 19th we stopped at a fine spring of water flowing out of the granite mountains to our left. The water comes from a large cleft in the rock; and about its source some cotton-trees have grown to great size. Two miles farther on is a similar spring, called the Lesser Galliago, but we did not visit it.

On the 20th we continued along the plain to the edge of a lake, on the other side of which was the great Hacienda of Encinillas. On the 21st we came within about 6 miles of Chihuahua, and entered the city the next day. Throughout the whole settled country in the neighbourhood of this city, the

greatest fear of the Indians prevailed. All the great Haciendas had suffered from their attacks; and it is dangerous to leave the city but in the company of an armed party. We were told that in 1830 the Haciendas of San Miguel and Baricora, near the Presidio of Buenventura, had more than 12,000 head of cattle and 1000 horses on them, but that they were now desolated. Since these attacks commenced in 1832, it was calculated that upwards of 10,000 persons, of both sexes and of all ages, had perished. Farther to the S. we saw constant evidence of these aggressions, which had been made even into the state of Durango. The frontier, which in the time of the Spaniards had been defended by the *Presidios*, and which, though the protection which they afforded enabled settlements to be pushed forward into the Indian country, have been neglected, and the Mexicans are actually being driven back to the S. This state of things may not last; but it has been the consequence of an unsettled government, which has hitherto been compelled to concentrate its forces in the interior to sustain itself, while its frontier has been commanded by savages, and its public roads, even its most populous and central districts, have been governed by robbers.

The city of Chihuahua is of considerable extent, and is the capital of the department of this name; but the population is said to be rapidly diminishing. In the centre of a square is a large cathedral, covered with numerous carved figures of saints. A great establishment of the Jesuits remains unfinished. Part of it is used as an hospital, and I occupied one of its rooms, along with some of my party. It was in the square which it forms that Hidalgo, who raised the cry of independence in Mexico, was executed. To the W. of the town is an aqueduct of some extent.

The mining interest in the neighbourhood has suffered, in common with that of other parts of Mexico. We were shown many rich specimens of silver-ore, of mines said to be unworked for want of capital; but these evidences of their supposed value are very delusive.

The foreign trade of Chihuahua is chiefly dependent on the Missouri trade to Santa Fé, or rather Chihuahua is the chief mart of this trade: so that for the purposes of this trade the best and shortest route is from the United States to Chihuahua, through San Antonio de Bexar, for Chihuahua is to the S. of this town. The distance from St. Louis to Santa Fé is about 1200 miles, and from Santa Fé to Chihuahua about 400 miles.

The road taken by us to Zacatecas has been described by former travellers. There are two routes: the most direct is about 700 miles through Durango; and the longest and most indirect was taken by us. The places at which we successively stopped were:—El Ojito, Huachuinba, the town of San Pablo, Saucillo

situated in a mining district, Cruces, the town of Santa Rosalia on the junction of the rivers Conchos and Florido, hacienda of Ramada, Saucillo, the hacienda and town of Huaquilla, La Comunidad near Atlotoloco, hacienda on the Rio Florido, La Noria, town of Cerro Gordo, hacienda of La Sarca, Palo Clino, town of El Gallo, hacienda of Dolores on the river Nares near to Cinco Señores, the mining town of Noria Perdisiera, the town of Cuencamé, Atotonilco, hacienda of Juan Perez, hacienda of Estanthuela, San Sebastian, Santa Catalina, the town of Saenes, Rancho Grande, the town of Fresnillo, Calela, Zacatecas. From Zacatecas we took the road described in the Journal of Captain Lyons to San Louis Potosi, and hence to Guanajuato. The places from Guanajuato to Queretaro and Guatitlan are noticed in the Memoir of Chevalier Löwenstein, in the Journal of the Society for 1841. We were very well treated by the Mexican officers; and were permitted, on our parole, to wander where we pleased in nearly all of the towns we arrived at. Ordinary travellers, in the present state of the country, do not obtain greater liberty.

At Guatitlan we turned from the direct road to Mexico, through a cultivated district among the mountains, to San Cristobal de Ecutipic, which lies opposite to that part of the plain between the lakes Cristobal and Tezcuco, where we arrived the last day of January, 1842.

Here, a few hours after my arrival, I left my companions. They were afterwards divided: part were taken to Puebla, and the others to the castle of Perote. Those who had preceded us were confined in the convent of San Iago de Tlaltelolco, in the city of Mexico; and in consequence of some of the party having escaped, they were kept in chains for some months, and were then released. Before they left the country, above sixty of the men who had left Austin had either been killed or had died of disease.

Through the great and unexpected kindness of Mr. Pakenham, the British minister, I remained with him some weeks, and had ample opportunity to visit the country in the neighbourhood of the city of Mexico.

Our journey, from the commencement to its termination, was greatly favoured by the weather. A few nights of rain enabled us to traverse the great plains of the north; but from the time we left Austin we saw only seven days of rain, three of which were during our stay at Zacatecas. The rainy nights during this period, including the snow-storm at Fray Cristoval, were not more than eleven. The roads were consequently in a good state.



## NOTE.

It is hardly possible to produce a stronger illustration of the importance of preserving and publishing the contemporary accounts of geographical discoveries than is afforded by the discussions upon the question of whether or not a title to the possession of Texas accrued to France by the discoveries of Robert Cavelier, Sieur de La Salle. Had these documents been published, the controversy between Spain and the United States respecting the western limits of Louisiana would have been reduced within a narrow space.

The purchase of Louisiana by the United States from the French government was not completed when President Jefferson wrote, "We have some claims to extend to the sea-coast westwardly to the Rio Norte or Bravo." (Correspondence, August 12, 1803, vol. iii. p. 519; see also vol. iv. p. 62, and Jefferson's Annual Messages from 1803 to 1806.) These claims, Mr. Bancroft states, arose from the discoveries of La Salle, which gave to France a title to territory to the W. bounded by the Rio Grande del Norte. (History of America, vol. iii. p. 174, 4th edition.) This he repeats several times, but most distinctly in these passages:—"On the side of Spain, at the W. and S., Louisiana was held to extend to the river Del Norte; and in the map published by the French Academy, the line passing from that river to the ridge that divides it from the Red River followed that ridge to the Rocky Mountains, and then descended to seek its termination in the Gulf of California. On the Gulf of Mexico it is certain that France claimed to the Del Norte" (vol. iii. p. 343). Again, he says:—"The French ever regarded the mouth of the Del Norte as the western limit of Louisiana on the Gulf of Mexico, and English geographers recognised the claim" (vol. iii. p. 333).

The value as an authority of the maps referred to is very easily disposed of. The one published by the French Academy is of the date 1752, or nearly twenty years after France had lost Louisiana, and therefore is of no authority, being unconnected with any official negotiations of the French government (Correspondence between Don L. de Onís and J. Q. Adams, Esq.; London, 1818, p. 90). The English map referred to, called "Pope's Map," cannot be treated as of the slightest importance. It is the practice at this time in England, France, and the United States to publish maps of Texas, drawing the boundaries of the new republic so as to include Santa Fé and nearly the whole of the department of New Mexico, which never formed a portion of the department of Texas, and whose inhabitants have never separated themselves from the Mexican government, nor by any act have expressed their wish to annex their territory to that of Texas. So little indeed, even in America, is the authority of map-makers, that the government of the United States last year, or in 1842, negotiated with that of Mexico, and not of Texas, respecting the escort and protection of the traders from St. Louis to Santa Fé, and actually intercepted a body of armed Texans who contemplated attacking the Mexican traders coming to the States from Santa Fé.

The historical facts connected with the claims alleged to have been formerly made by France are much more interesting.

The first notice which I have found of the expeditions of La Salle relative to the discovery of the Mississippi, is in a letter of M. Talon, one of the ablest of the Intendants of Canada under the French government. It is dated in October, 1671, and is addressed to the celebrated Colbert. He says:—"Le Sieur de la Salle n'est pas encor de retour de son excursion du côté de sud de ce pays" (MS.). This, I presume, is one of the five expeditions which La Salle himself stated to have been made by him. By letters patent, dated March 13, 1673, La Salle received the grant of Fort Frontenac (Kingston). In 1684 he presented a memoir to the French minister Seignelay, "Sur l'entreprise qu'il a proposée sur une des provinces du Mexique." This document, nor indeed any other written by La Salle, has not been published. He proposed as the object of the expedition—"Trouver un poste où les Français se puissent établir et fatiguer les Espagnols dans les lieux d'où ils tirent toutes leurs richesses;" and he expresses his expectation that his party "ne trouveront point de résistance dans la province qu'il a dessein d'attaquer, où il n'y a pas plus de 400 Espagnols naturels." In consequence of this application, a licence from Louis XIV. was issued to La Salle, dated St. Germaine-en-Laye, May 12, 1678, setting forth:—"Nous avons reçu agréablement la très humble supplication que nous a été faite en votre nom, de vous permettre de travailler à découvrir la partie occidentale de la Nouvelle France, et nous avons d'autant plus volontiers donné les mains à cette proposition qu'il n'y a rien que

nous ayons plus à cœur que la découverte de ce pays dans lequel il y a apparence que l'on trouvera un chemin pour pénétrer jusqu'au Mexique."

With this licence La Salle left France in 1675 to undertake the discovery of the Mississippi to the south. He was delayed on his route in the upper lakes of Canada, and was compelled to return to Montreal. His will is dated at this place, on August 11, 1681. At the end of January, 1682, he reached the Mississippi, and arrived at the sea on the 7th of April in the same year. Juan de Añasco had probably reached this spot before, but his adventures hardly disturb the title and honour due to La Salle as an original discoverer of the entrance of this mighty river into the Gulf of Mexico. There has been some difference of opinion respecting the year in which this discovery was made, but I have seen three letters of La Salle, one written at the fort St. Louis in Illinois, dated April 2, 1683; another written at the portage of Chicago, dated June 4, 1683; and a third dated June 7, 1683, of great length, and giving an account of the state of Indian affairs in the neighbourhood. One of these letters distinctly refers to his expedition in the previous year. These dates, in connection with the date of his will, independently of Tonty's authority, fix the year in which he reached the sea beyond all future controversy.

A narrative of this expedition was published at Paris in 1697 under the name of the Chevalier Henri de Tonty, who, Charlevoix says, was a person very able to have given an account of a colony in the establishment of which he had laboured more than any other person, but he had been assured that M. de Tonty had disavowed the publication, declaring that it did him no honour in any part of it (See preface of the *Histoire Générale des Voyages*, Prevost's, vol. xiv.). It is gratifying to be able, after the lapse of nearly one hundred and fifty years, to vindicate the veracity of Tonty. I am in possession of a copy of his original relation of this expedition. Comparing it with the publication bearing his name, it is evident that this MS. was employed, for it contains passages of the original, but the interpolations are very numerous, and the facts mentioned are altered and misplaced. The reader who may possess the published work will be able to judge of the extent of these changes by comparing the following extract from the MS. with that portion of the publication describing the arrival of the party at the sea:—"Nous continuâmes notre route, et après 40 lieues de navigation nous arrivâmes le 7 Avril à la mer. M. de La Salle dépêcha des canots pour visiter les chenaux, partie furent dans le chenal de la droite, partie dans celui de la gauche, et M. de La Salle choisit celui du milieu. Le soir chacun fit son rapport, savoir, que les chenaux étaient très beaux, larges, et profonds. On calena à la terre de la droite où l'on arbora les armes du roi, et l'on retourna plusieurs fois visiter les chenaux. Le même rapport fut fait. Ce fleuve a près de 800 lieues sans rapides; 400 depuis les Scioux et 400 depuis l'embouchure de la rivière Illinois jusqu'à la mer. Les bords en sont presque inhabitables à cause des inondations du printemps."

It is remarkable, however, that the errors of the dates in the publication, which have been commented on at different times, are to be found in the MS. of Tonty. They are to be explained by the concluding passage of the MS. which is in these words:—"La perte que j'ai faite de mes mémoires dans mes voyages fait que cette relation n'est pas accomplie comme je le souhaiterais." In a *placet*, countersigned by the Count de Frontenac, Governor of Canada, he sets forth his services, and mentions that when in France he had solicited employment, but being unable to obtain it upon account of the peace, he was induced "prendre partie en 1675 de suivre feu M. de La Salle pour l'accompagner dans les découvertes du Mexique, où il a été le seul officier qui ne l'a pas abandonné jusqu'en 1682 qu'elles furent finies." In this document, he correctly notices the year of his voyage down the Mississippi, which in his MS. relation of it is certainly erroneously stated to have been in 1683.

La Salle left Canada for France in 1683. On his arrival in Europe he presented a memoir to Seignelai, and proposed an expedition to the Mississippi by sea. He says that he thought that he had sufficiently established the fact of his discoveries—"Par l'acte, signé de tous ses gens, qui fut mis l'an passé entre les mains de Mgr. Colbert par M. le Comte de Frontenac, comme aussi par le rapport qu'en a fait le Révérend P. Zenoble, missionnaire, qui l'a accompagné dans ce voyage et qui présentement est gardien de Bapaume; par le témoignage de trois de ceux qui l'ont accompagné qu'il a amené en France, et qui sont maintenant à Paris; par le témoignage de plusieurs autres personnes venues cette année de Canada qui ont vu le nommé Vital, envoyé par M. de la Barre pour en apprendre des nouvelles sur les lieux, et qui a confirmé de la découverte. Toutes ces preuves suffiront pour détruire ce que pourraient avoir écrit au contraire des

personnes prévenues qui n'ont aucune connaissance non plus des pays où elle s'est faite puisqu'ils n'y ont jamais été. Mais il espère détruire toutes ces préventions en exécutant le dessein qu'il a, sous le bon plaisir de Monseigneur, de retourner au pays de sa découverte par l'embouchure de la rivière dans le Golf de Mexique."

In this same memoir La Salle describes the extent of the country which he considered to be included within the limits of his discovery:—"Au lieu que les autres colonies sont ouvertes et exposées aux descentes des étrangers par autant d'endroits qu'elles ont des côtes baignées de la mer, et qu'elles ont besoin par conséquent de beaucoup de monde pour en garder les avenues, un seul établissement fait vers le bas de la rivière suffit pour conserver un terrain qui a plus de 500 lieues du nord au sud, et bien davantage du levant au couchant, parceque les rivages n'en sont accessibles du côté de la mer, que par l'embouchure du fleuve, le reste de la côte étant impénétrable à plus de 20 lieues en profondeur à cause des bois, marais, cannes, et des terres tremblantes où si il est impossible de marcher, et c'est peut-être ce qui a fait négliger la découverte de cette rivière aux Espagnols s'ils en ont eu la connaissance. Ce pays n'est pas moins bien défendu dans le profondeur des terres contre les irruptions des Européens qui en sont voisins à l'est; à l'ouest par des grandes chaînes de montagnes dont les branches du fleuve tirent leur origine. Il est vrai qu'il est plus ouvert au sud-ouest où il confine avec le Mexique, d'où la rivière nommée le Seignelai, qui est une des branches du fleuve Colbert (Mississippi), très navigable, n'est séparée que par une forêt de trois à quatre journées de traverser. Mais outre que les Espagnols sont faibles et éloignés du secours de Mexico, et de celui qu'ils pourraient attendre par mer, cet endroit est à couvert de leur insulte par le grand nombre de sauvages belligieux qui leur serment ce passage, qui ont avec eux des cruelles guerres, et qui leur seront bien plus de mal quand ils se verront soutenus par des Français, &c."

As dependent on the occupation of the river Mississippi, and at the same time respecting the rights of Spain, this general description of the extent of the country named Louisiana by La Salle himself, could not have been made more complete during the period that France had that occupation.

The expedition proposed in this second memoir of La Salle sailed from Rochelle, July 24, 1684. (Joutel's Journal Historique, p. 13; Paris, 1713.) The naval officers did not act cordially with La Salle, and the entrance of the river into the gulf could not be found. The vessels were carried to the coast of Texas, and the point at which a landing is supposed to have been effected was in Matagorda Bay. Upon the departure of the naval officer, M. de Beaujeu, on the 14th of March, 1685, a fort was built to protect the party from the savages, who had already killed some of their number. Another fort was subsequently built, to which the party removed. In October La Salle left with some companions in order to seek the Mississippi, and did not return to the fort until March, 1686. In April he again left for this purpose, and returned to the fort in August, without having succeeded. These expeditions were to the east. He made another attempt in January, 1687, dividing his party as before, and leaving M. Barbier in command of the fort. In this journey he was shot, on the 20th of March, 1687, by one of his companions. Some of his party, among the number Joutel, the writer of the narrative, found their way to Canada (Joutel, Journal Historique).

The fate of the men left by La Salle at the fort is a very important fact, and is neglected by American writers. It appears that the Spaniards were alarmed at the expedition, and took immediate steps to check it. ("Les Espagnols du Nouveau Mexique, que l'entreprise de La Salle avait alarmés, n'étaient déjà donné du mouvement pour la traverser." *Histoire Générale des Voyages*, vol. xiv. p. 623; Paris, 1757—also, Joutel, p. 365.) The Spaniards fell in with some of the French, whom they made prisoners, and the settlement—if, from the temporary object for which it was made, it can be so called—was broken up.

Upon this expedition of La Salle, and not upon the settlement of the Mississippi by the French, the alleged title of France to Texas rested (Correspondence of Don L. Onís and Mr. Adams, *passim*). Yet it is clear that Spain did not allow the occupation of the country to be made. Moreover, how could the landing E. or on the banks of the Colorado give a title to the territory to the Rio Grande? The inference from the fact that the Spaniards had previously discovered the Rio Grande, and were therefore entitled to the territory between it and the Mississippi, is equally complete. But in 1698 the Presidio of Bexar was built, and in 1716 that of Goliad, or del Espíritu Santo (Congressional Papers, 25th Congress, No. 40, p. 3), thus securing to Spain an undisputed right both by discovery and occupation to all the country W. of the Guadalupe. The



Spanish title east was made complete by the destruction of La Salle's fort, the establishment of the post on the Adams, existing in 1718, and by the establishment of the town of Nacogdoches in 1732. A French title to the territory to the Rio Grande never existed—nor is there a single fact to sustain it—setting aside any notice of the aggression intended by the settlement on the Mississippi, and the admissions respecting the Spaniards made by La Salle himself. From a letter of La Harpe, in 1719, and an order of Bienville, the governor of New Orleans, in 1721, it appears to have been thought that the landing of La Salle in Matagorda Bay gave to France a title to some portion of Texas (Correspondence between Onis and Adams, p. 128); but the French government did not sustain this opinion, and Spain continued in the undisturbed occupation of it for upwards of a century after La Salle's death and until the establishment of the independence of Mexico.

In 1802, France, which had ceded Louisiana to Spain in 1763, recovered possession of the country, and the next year it was agreed to be sold by Buonaparte, then First Consul, for eleven millions of dollars to the United States. When the purchase was proposed, Mr. Jefferson certainly expected part of the boundary of Louisiana to be "the high lands on the western side of the Mississippi, inclosing all its waters—the Missouri of course—and terminating in a line drawn from the north-western point of the Lake of the Woods to the nearest source of the Mississippi as lately settled between Great Britain and the United States" (Jefferson's Correspondence; Aug. 12, 1803, vol. iii. p. 519). The purchase in its terms included "All lands on the east side of the Mississippi river, not then belonging to the United States, as far as the great chain of mountains which divide the waters running into the Pacific and those falling into the Atlantic Ocean, and from the said chain of mountains to the Pacific Ocean between the territory of Great Britain on the one side and of Spain on the other" (History of the Federal Government; Boston, 1840, p. 130). This extension of the limits of Louisiana over the mountains, was, after much resistance, allowed by Spain, in consequence of the use of very inaccurate and unauthentic documents and maps, in the treaty made between it and the United States in 1819, which fixed the Sabine River as part of the western boundary of the United States, and declared the extreme limit of the N. of Mexico to be a line running N. from the source of the Arkansas to the 42nd parallel, and thence to the Pacific. (See Congressional Papers, 27th Congress, 1842, containing the Survey of the River Sabine, &c.) The effect of thus extending this line to the Oregon territory is well known.

The MS. to which I have alluded, and from which my citations are made, I propose to print at a future day. T. F.

## II.—*Notes on the Coast Region of the Texan Territory: taken during a Visit in 1842.* By WM. BOLLAERT.\*

*General Remarks.*—Three great natural divisions are generally recognised in the geographical formation of Texas—the level, undulating, and mountainous. To this is sometimes added "the

\* Mr. Bollaert's paper was accompanied by the following charts and sketches from surveys by American (U. S.) officers, which are preserved in the Society's archives, but which it was deemed unnecessary to have engraved, as Mr. Arrowsmith's map of Texas, published in April, 1841, will enable every reader to follow Mr. Bollaert in his excursions:—

1. Sketch of the Line of Coast on the Gulf of Mexico, from the mouth of the Rio Grande del Norte le Balire, on the S.E. pass of the Mississippi, laid down according to the observations of Commodore Moore and Captain Bayleyn.
2. Sketch Plan of Galveston Island.
3. Chart of the Harbour of St. Luis, surveyed by Captain Hinton.
1. Chart of the mouth of the Sabine, by Major Grahame, Captain Pellat, and Lieutenant Lee.

first and smallest division, consisting of the low and level tract of land contiguous to the sea," in the N.E. portion of the republic.

The mountainous region appears to consist of limestone; the undulating, of rock-sand and alluvial deposits; and the low or level lands towards the coast, of alluvial matters entirely, with a sandy sea-shore.

The long and narrow islets forming the coast appear to have been bars of sand and alluvial matters, which have gradually risen above the level of the sea and kept in that position by the S.E. currents and banking up nature of the action of the tides, aided by the deposition of oyster and other shells, drift-wood, and seaweed, with the pretty constant succession of S.E. winds banking up the sand and preventing the alluvial depositions brought down by the rivers, as now through the marine lagoons, from escaping entirely into the gulf.

According to observations, the coast of Texas, that is, its islets and bars, are encroaching upon the sea, more particularly towards the delta of the Mississippi: thus in time we shall have, what Humboldt regrets, when speaking of the sands, &c., as "miserably contracting the bed of the Mexican gulf;" but to compensate for this we shall have beautiful prairies offering an abode for animals and then for man.

The "S.E. trade winds," with some variation, come as far as Cape St. Antonio (Cuba), excepting in the winter months, when the "norte" becomes the characteristic wind, blowing a gale occasionally, but not of long duration.

For the greater part of the year a continuance of S.E. winds come to the shores of Texas with such variation as is consequent upon local obstructions; and the effect produced on the oceanic currents is, that the gulf stream acts indirectly, though not directly, on the Texan shores.

I have it in contemplation, when opportunities offer, to examine minutely into this subject, and investigate the exact period and duration of winds on the coast, the velocity of the Texan rivers, the effect of tides, the velocity of the currents over the bars at different periods of the year, temperature of the ocean at various depths, &c. &c.

The gulf stream commences in the equatorial regions, passes the West Indies, round through the Gulf of Mexico and Florida, into the Atlantic, up to Newfoundland, and from thence across to the European shores. Independently of this, there are other streams or currents formed by local circumstances—some of these affecting the coast of Texas. It is a generally received opinion that a continuance of wind from any direction forms currents at sea, in the direction such wind is blowing. As bearing upon this view I may mention a fact connected with the gulf stream.

The following is the copy of a paper found in a bottle which was picked up on the gulf shore, 12 miles to the southward and westward of the mouth of Caney Creek, on the 25th of May last, having been overboard thirteen months and one day:—  
 "24th of April, 1841, latitude  $10^{\circ} 43'$  N., longitude  $43^{\circ} 53'$  W., General Palmer Transport, with three companies of the 3rd W. I. regiment on board, from Sierra Leone, bound for Jamaica. All well; 18 days out; 1929 miles from Jamaica this day. This bottle is thrown over to try the currents. Whoever may find it will be so kind as to publish the same in the newspapers. Long live the Queen."

The distance travelled was 3229 miles = 248 miles per month, or a little better than 8 miles per day—that is assuming the bottle to have come a straight course—but it is enough to show that the currents set westerly towards the coast of Texas.

The gulf stream properly so called, it is said, does not come upon the coast of Texas; but as the winds during the greater part of the year are from S. and E., producing currents N. and W., it is probable that it was these currents brought the bottle in question to the Texan shores.

The currents in-shore will vary a little as the wind may happen to veer, and this variation will be comparatively rapid, owing to the shallowness of the water.

I may state here, that in October,\* 1837, a strong gale from E.N.E. to E.S.E. filled the bays or marine lagoons along the coast. The wind chopped round to N. and W., blew violently from that quarter, and as the passes or outlets over the bars were of inconsiderable dimensions, the inland parts of the coast or islets were overflowed with the waters from the bays; and at Galveston island to the depth of 4 to 5 feet. There is some difference of opinion relative to the average height of Galveston island above the sea, but it is considered to be about 10 feet, and some of the sand hills along the coast may be 20 feet.†

The rains form on the low alluvial lands on the coast, and on the islets which festoon the whole sea-board, large ponds or fluvial lagoons, some of considerable extent; and these lagoons become the abode of the cayman or alligator, and generate immense numbers of mosquitoes. When this part of the country becomes settled, canals or drains will be cut which will remove sundry other inconveniences caused by these marshy lagoons.

*Maps of the Country and Charts of the Coast.*—By examining

\* 4th and 5th of October, for several days before, the weather was thick and heavy, the tides were high, and ebbed less than they rose.

† I am informed by a gentleman who has traversed every part of the island, that 8 feet is about the average, and 14 feet the sand-hills, and that a portion of the island is below high-water mark; spring tides  $3\frac{1}{2}$  feet.



the maps and charts of Texas it will be seen that, before the true latitude and longitude of Galveston was given a short time since, to be in  $29^{\circ} 16' 37''$  N.,  $94^{\circ} 49' 41''$  W., there was not one point correctly laid down. Even from the mouths of the Mississippi to Sabine river was very incorrect, and much of that line still remains so.

The best coast line of Texas was that given by the map of the Land-office in 1839, which placed the mouth of the Rio Grande in  $97^{\circ} 30'$ , but by recent observations made by Commodore Moore, it is placed in  $97^{\circ} 11'$ . A MS. chart has just fallen into my hands by a Captain B., who places the Rio Grande in  $96^{\circ} 51'$ , and I believe Captain B.'s chart is about to be published by Blunt, of New York; and I am also informed that a copy of it was sent to Noric in London. All this is somewhat contradictory; but for the present I am inclined to give the preference to Commodore Moore's observations, a copy of which I sent to the Society some time since. I am now constructing a chart upon the faith of Commodore Moore's observations and the observations of others. Captain B. is considered a good navigator and pilot, and I shall remit to you shortly his observations, &c., from the mouths of the Mississippi along and off shore to Galveston, when it will be seen that he has laid down large shoals, sand-banks, &c., and lines of soundings. Thus it appears to me that no map of Texas can be looked upon as correct until the coast line is accurately laid down.

Commodore Moore has worked up good surveys of Galveston and Matagorda bays, which I will send as soon as I get them. I may observe here that every four or five years the shoals and passes over the bars vary considerably; such as at "Passo Caballo," the principal entrance to Matagorda bay. But the pilots all along the coast are intelligent on these points, and by attention to the "lead" on approaching the coast (which is not a stormy one), no accidents ought to occur. If in winter a vessel is caught by a "norther," this will blow her off shore. And during the greater part of the year moderate S.E. winds prevail, but a sharp look-out ought to be kept for currents (which will be in the direction of the prevailing wind), and should care not be taken, a vessel becalmed near the land might drift on shore; but ere this could take place a vessel could come to anchor at any point all along the coast.

The sea-board forms a pretty straight and even line, owing to the equable action of the tides; but is on the opposite side made up of bayous or irregularities; and on the island are several fluvial lagoons. Leaving the town of Galveston, and along the shore some 15 miles, the "Three trees" are arrived at, which forms a good landmark. What is known as the "Three trees"

is composed of a clump of some twenty trees, then a small grove, and lastly three trees. Galveston island is covered with pasturage all the year round, affording food for cattle and deer.\*

*First Voyage along the Coast Westward in March, 1842.*—The coast is uninteresting, being so low and in-shore, particularly in the vicinity of the bars; breakers may be generally observed; care must be taken in approaching these bars; and, as I have before mentioned, if becalmed, to take notice of the in-draught current; there have been vessels lost for want of this precaution. Went through the Aransas pass, 8 to 9 feet water, into bay of same name. Got to Live-oak point. The bay is full of islets, sand-banks, and shoals; can only be navigated by small craft or steamers drawing but a few feet water, except in certain channels where the water is deeper.

About Live-oak point there is considerable depth of water; the land about here is somewhat sandy, but grows Indian corn, &c., and the water from the wells is good. Here is some live oak timber. Fish is in abundance, and plenty of pasturage for cattle.

Sailed up to Copano, and came to anchor at Black point, near to which the River Aransas comes into the bay. About here the land is loamy and coast higher. The pasturages are very good, being of musquit grass, and forests of musquit timber (a species of the acacia). The southern breeze sweeping over the prairies and through the musquit trees (being then in flower), fills the air with sweet-smelling perfume. Here is abundance of deer, rabbits, birds of all sorts, fine fish in large quantities, as well as oysters, crabs, &c. I could hardly help imagining when standing on this primeval land—not a dwelling as yet to be seen—that the shores of these bays would in time be crowded with habitations; that these waters would afford the easy means of conveyance for the products of these countries to other lands, and in return import from other realms. All was now so still and in such quietude, all that was heard was the rustling of the breeze through the trees, or the butterfly flapping its wings.

I returned to Live-oak point and accompanied a party to Corpus Christi in a small sailing-boat. Running down Corpus Christi bay, to the right is seen McGloin's bluffs, these being comparatively high land and good grazing grounds.

The landing at Corpus Christi (Messrs. Kinney's and Aubrey's *Rancho*) is not commodious, when it blows fresh on shore. A trifling trade has been carrying on here with the Mexicans from

\* Some two years since boring for water on the Artesian principle was commenced, but no water was got. The stratum first gone through was sand—then sand and loam: some 60 feet was attained. The water from wells on the island a few feet deep only, is slightly brackish. Rain water caught in large vats is used for drinking.

Matamoras on the Rio Grande, but the unsettled state of affairs between the two countries has almost put a stop to business. Ordinary rise of tides here said to be 18 inches. The land here is high; there are a few trees, good pasturages, and moderately good lands for Indian corn, &c.

At Corpus Christi inlet there are two passes or channels: the northern one is that which is used; it is short and narrow, having 4 to 5 feet water.

There is a large mud-flat inside the Aransas pass. It is said that at very little expense and no difficulty, the channel through it might be widened and the Corpus Christi bay would be navigable for vessels of considerable burthen; and this will doubtless be done when commercial affairs are of sufficient importance in this direction.

Oyster-beds are in abundance at and in the vicinity of Live-oak point; large quantities of dead oyster and other shells line the shores and contribute to the formation of land; their calcareous nature assists in strengthening and giving body to the new land so rapidly coming into existence all along these coasts. I visited La Mar, which is opposite to Live-oak point; the lands looked good, with plenty live and post oak timbers, and in the prairies numberless pretty wild flowers. I should think the lands about here are good for grazing.

After touching at the small harbour of St. Luis I returned to Galveston. I may mention here that I availed myself of a passage on board of an armed steamer on this trip. The object of her cruise was to intercept some Mexican transports reported off the Texan coast, to reinforce a division of the Mexican army who had a short time previously crossed the Rio Grande, entering St. Antonio de Bejar.

*2nd Voyage along the Coast, Westward—April.*—Left Galveston with fine S.E. breezes. Southerly gales soon came on, with heavy cloudy weather. Wind chopped round to N., with lightning and thunder, and a considerable diminution in the temperature of the air. Winds variable, but inclining towards the W. On 17th, strong breezes from N. and N.W.; 7 A.M. 54° of air, of water 67°. These northerly winds are very late this season, but the cool air they bring braces and invigorates the system.

*Passo Caballo.*—The repetition of "northers," or more properly the rush of waters caused by them, have washed away the western banks of the pass to the extent of 400 yards within the last three or four years.

By referring to Wallick's survey, p. 38, vol. i., Kennedy's Texas, what is placed as "N. breakers" extends E. and E.N.E.  $\frac{1}{2}$  a mile more than laid down. The "False channel" and the



one next to it, called "Swash channel" and "Pelican Island channel," are all diminishing. The passage, or bayou, N. of the pilot houses, is filled up as well as others. I do not think it necessary to give sailing directions here, for good pilots are always in attendance: but I may remark that the long peninsula which terminates at Decrow's point, and forming a barrier against the sea, protecting Matagorda bay, is marked in an old Spanish map as a *chain of islands*.

Inside Decrow's point there is deep water; there is the same over to Tres Palacios. At this last place the iron brig "Iron-sides," 260 tons, took in a full cargo of cotton this season.

In running up for the town of Matagorda even small craft must lay a considerable way off and load from lighters.

The River Colorado (at the mouth of which are Selkirk's islands) brings down large quantities of alluvial matters, which appear to be forming islets and shoals in a line across to the peninsula, comprising Dog island. But the serious obstruction to the navigation of the Colorado is "The Raft." It consists of detached masses of timber with portions of the river intervening; the different portions of the raft, if united, would form about  $1\frac{1}{2}$  mile, some of which is floating and other parts sunken and difficult of removal. In ascending the main channel of the river from the landing at Matagorda, very little difficulty from "snags" or other impediments is found before reaching the first raft in the middle branch, a distance of  $5\frac{1}{2}$  miles. Thence  $1\frac{1}{2}$  mile to the head of the West branch the obstructions are not of any magnitude. Near this the channel is closed by one raft of about 200 yards in length, and is nearly clear of "snags" for a further distance of 2 miles. The expense of clearing this raft is estimated at about 30,000 dollars. The citizens of Matagorda and settlers on the Colorado are making arrangements to commence operations.

The town of Matagorda is pleasantly situated on a long bluff. It is healthy; the prairies round about have good pasturages, the shores of the bay are skirted with groves, the banks of the Colorado well timbered, and the lands for the growth of cotton are very highly spoken of. Game, fish, turtle, &c., in abundance.

On the 25th a very heavy thunder-storm came on from N.N.E. with hail and rain, cooling the air very considerably. I traversed the prairies towards Caney creek; they were covered with pasturages and flowers. Passed Little Boggy (a trifling stream), and thence to Big Boggy creek, which is slightly wooded: here hung on the trees the "Spanish moss" (*Tillandsia usneoides*) in great abundance. It gives a melancholy appearance to the woods, and is said to be hurtful to the trees. This moss is used in lieu of horsehair for mattresses, &c. It is prepared by keeping it steeped in water for some time, when it loses its vegetable juices, becomes

black and rigid and fit for use: it sells for about 2d. to 3d. per lb. Game is abundant all over the country. Wolves are numerous, and occasionally a panther and leopard cat is seen. In the creeks some alligators. Snakes of all sorts are to be met with, even to the copper-head moccassin and rattle-snake. Much has been said relative to antidotes for the bite of these venomous reptiles. There appears to be a respectably attested instance of death caused in three hours in the person of a Mr. Talbot in the eastern country, who had one of his fingers bitten. No antidote is here mentioned. In travelling through this country "snake-stories" and their antidotes are very numerous. Some recommend internal and external applications of tobacco-juice, others gunpowder and vinegar; even "*brandy and salt*" has been mentioned: and the last new "notion" is, that some old hunter has discovered a "weed" that grows in great abundance wherever venomous snakes abound, the application of this said "weed" internally and externally is the "sovereign remedy!"

The wild indigo-plant is said to grow in Texas, but as yet I have not seen any indigo prepared from it; the cactus thrives here, but as yet no cochineal is collected. With regard to objects of natural history, a Mr. Smith has been collecting for some time, principally for the Earl of Derby. A Dr. Weideman has been attending to botany in the vicinity of St. Antonio de Bejar; and I believe that a Mr. Drummond has returned to Europe with a considerable Texan Flora.

I visited several cotton plantations during this trip, particularly those on Caney creek; the lands here are very fine for cotton, sugar, tobacco, and other tropical plants; the maize or Indian corn grows most luxuriantly.

During the summer months intermittent fevers are not uncommon in the "bottoms" of the rivers or creeks; but the planters and their families may avoid this fever by living on the edge of the prairies that skirt these "bottoms."

On this trip I fell in with some Caranchuhuas Indians (or Koronks). They were formerly a powerful tribe, but have become dispersed and dwindled away since the white man came into their lands. There have been several battles between them and the intruders. The first of any importance was that known by the name of the "battle of the Three Trees" in 1819, on Galveston island, between these Indians and Lafitte, the pirate of the gulf. The Koronks brought 300 warriors into the field, Lafitte 200 followers. The Indians lost 100 warriors; Lafitte had eight or ten killed and thirty or forty wounded. There was another sanguinary battle between them and the first settlers at Matagorda about 1827. The greater number of Koronks rove about Corpus Christi and adjacent bays. A few wander about Matagorda. They are a

good-looking race, rather indolent, employ themselves in fishing and hunting: they live in tents made of skins; and are good shots with bow and arrow. To preserve themselves from the bite of the mosquito they anoint themselves with an unctuous substance prepared by themselves.

The following statement was made by Isowacany, the principal chief of the Comanche nation, when on a visit to St. Antonio some few years since. The Comanches claim to be lineal descendants of the subjects of Montezuma II. The chief said that when Cortez landed in Mexico, he found the country torn to pieces by internal factions, and was enabled, by employing the disaffected chiefs, to raise a force to seize upon the capital. Those chiefs believed, if they could destroy the power of Montezuma, they could easily dispatch the Spaniards, and have the control of the country in their own hands. But too late they ascertained they had introduced a harder master, and that unconditional servitude was all they had to expect. Many bent the neck to the conqueror: but some preferred exile to servitude, and set out on a pilgrimage to the north, in hopes to find a land where they could enjoy their ancient institutions in peace. They travelled for many weeks, and at last came to the Great River of the North (Rio Grande), where they encamped, and sent out twenty chosen men to examine the adjacent country. They crossed the Great River, and ascended one of the highest peaks, which overlooked the adjoining plain. The prairie was covered with buffaloes, deer, and antelopes; and they thought they had reached "*the happy hunting-ground*," and the word *Texas! Texas! Texas!* burst from every tongue. It was decided that this country should be their future home, and go by the name apparently furnished by the "*Great Spirit*." *Texas* is the Comanche name for the residence of happy spirits in the next world. Thus the Spaniards from *Texas* formed *Texas*, which means the "*happy hunting-ground*," or the *Elysium* of the Comanches.

The following satirical couplet gives the etymology of the name, as at present received in the Western States of the Union:—

"When every other land rejects us,  
Here is a land which freely takes us (Texas)."

*May 20th. Journey from Galveston to Matagorda.*—About fifteen miles down the island the "*Three Trees*" are passed, and fifteen miles further on the S.W. end of the island is attained. The road is along the sea-shore, which is strewn with drift wood, here and there lumps of asphaltum and small rounded masses of white pumice-stone. At the S.W. end there is a ferry that communicates with the island of St. Luis. Before the town of St. Luis there is deep water, the bar is good and port easy of entrance.

From St. Luis to Velasco is a distance of 12 miles; this town



is on the river Brazos; on the opposite side is the town of Quintana. Continuing along the coast for 9 miles came to river St. Bernard; here the bar is bad, and no great width of river. About here for the first time may be seen a small pebble or so and a little alluvial soil on the banks of the river. To this spot from Galveston and further on all is sand, very few shells, large quantities of drift-wood (collecting for ages) forming a barrier to the sand blown up by the S.E. winds from the shallow shores, which sands extending gives height to the coast, and moreover encroaches upon the gulf of Mexico—this is assisted by marine shells, sea-weed, and such plants as first grow on sea-shores. At a short distance from the beach the land gives pretty good pasturage, but somewhat tough; but further inland the grazing for cattle is good. When the alluvial deposits are in any quantity the pasturages of all kinds are in abundance—forming the prairies; and along the margins of rivers and creeks the timbered lands appear. Between the rivers, or from one stream to another, where the land may be low, so that moisture from the rains can lodge, timbers likewise are in abundance.

From the San Bernard to Caney creek (passing Cedar lake) is 8 miles. Caney creek is forded through the breakers off its mouth. I may observe here that, excepting the large Texan rivers, the others may be easily forded during the greater part of the year, but during the wet season they are deep and run rapidly.

From Caney creek to the town of Matagorda (from *mata* a bush, and *gorda* thick or stout) by the prairie is about twenty-five miles (See Observations between Matagorda and Caney, p. ).

I returned to Galveston from Matagorda by the upper part of Caney creek (passing cotton plantations), from which to Cowan's ferry on the San Bernard is 10 miles. Three or four more brought us to the town of Brazoria. To this place the road is through woodlands, shading the traveller from the hot sun's rays. The Brazos river at Brazoria is deep, and the banks are steep. At a short distance from the banks of the river 20 feet was dug before water was obtained, and in excavating, impressions of fish found in the strata. From Brazoria to the mouth of the Brazos there are many cotton plantations, in the well-timbered lands, and on their margins in the prairies, and these prairies go down to the sea-coast.

*Voyage from Galveston to the Mississippi. June.*—From Galveston to the Sabine river is a low coast with a few houses and occasional clumps of trees. Here is the divisional line, on the W. bank of the river, between Texas and the United States. The formation of the coast from the Sabine to the Mississippi will be better

seen by reference to the new chart I am preparing than any description I can at present give.

I may state that from the Sabine to Ship or Last island, Barrataria Bay (the first rendezvous of Lafitte the pirate) and on to the Mississippi the shores are lower than the Texan, composed of mud and sand islets, covered with drift-wood. The shores are full of shoals rapidly increasing, which will in time become islets festooning the coast, and ultimately firm land. Came to anchor with lighthouse of the S.W. pass of the Mississippi 2 miles to the N.E., within two or three hundred yards of the shore, and in 2 fathoms fresh water. Fresh water extends much farther off the land. The shores of the innumerable islets are slippery and muddy; no rock, stone, nor even a pebble to be seen. When this alluvion becomes dry, it indurates slightly: it is of a light brownish colour. On it reposes large quantities of drift-wood of all dimensions from the fragile branch to trunks of trees of giant growth. The decomposition of this drift-wood is very rapid under the blistering summer sun of these regions and copious rains, forming in time soil for the reception of vegetation and abode of man. The *Teredo navalis* is actively at work amongst the drift-wood, reducing speedily into very friable stuff immense trees, breaking by the mere impression of the foot. The plants are few, with the exception of the samphire, which is in great abundance, luxuriating in its almost solitary position. A tough grass makes its appearance, and a very few other plants. Alligators and sharks revel in these waters, and the myriads of mosquitoes of several species (the *Galley-nippers* to wit) anything but pleasant. Sea-birds did not appear at this time of the year in any number; the sea and river are filled with fish.

Entered the S.W. pass and cruized round to the Balize. This spot is the residence of the pilots, who have formed themselves into an association. The Balize is an eternal swamp, indeed ere a residence can be erected, earthy matter must be brought from some other locality. The only hunting is that of alligators. Visiting the New World by the mouths of the Mississippi gives one but a melancholy idea of these vast countries; yet there is one thing that forcibly strikes the traveller—the mighty Father of Rivers.

Some 35 miles up this majestic stream Fort Jackson is seen on the left; it is of large dimensions, built of brick in a swamp, and in no very picturesque situation; it is out of repair: during the last excitement resulting from Canadian affairs between the United States and England some repairs were commenced, but soon discontinued. On the other side of the river stood the Spanish Fort of San Felipe.

Snags or points of trees sticking upright or slanting in the river

annoy vessels very much. Sailing vessels are towed up by "steam-tugs." The crews, having nothing to do, amuse themselves shooting alligators. The shores of the river are low, covered with rushes and cane-brakes, and lined with drift-wood, which with the immense quantity of earthy matter brought down forms new lands rapidly, particularly at the mouths of the river.

I went up the Mississippi on board of a steam-tug. We had two large vessels lashed one on either side, their cargoes being of ice from Boston. Some fifty vessels of ice, averaging 300 tons each, arrive at the "Crescent City" annually, selling on an average at two cents per lb.; this will give about 672,000 dollars. The ice may cost less than one cent in Boston, and people concerned in this trade call it a good or bad "harvest" of ice. I remained a short time in New Orleans, and then returned to Galveston. The author of 'Cyril Thornton,' Captain Hamilton, when speaking, in his 'Men and Manners in America,' of the Mississippi and its delta, amongst other remarks observes:—"It would be difficult to convey an idea by words of the effects which this most dismal scene produces on the mind, heart, and imagination of the spectator. It seems as if the process of creation was incomplete, and the earth yet undivided from the waters, for he beholds only an indeterminate mass which admits of being absolutely assigned to neither element. He feels that he has forsaken the regions of the habitable. Above, beneath, around there is nothing to excite his sympathies, and probably for the first time in his life he becomes conscious of the full sublimity of desolation." For this trip I am indebted to some friends who kindly offered me a passage with them in the Texan privateer Frolic of sixteen tons, and I may state that we took a Mexican vessel of 100 tons some 25 miles off the Mississippi.

*Journey to the Eastern Country. June.*—According to the ordinary charts it would appear that the course to Houston was to the N. of Pelican island; but the one generally pursued is to the S. of that island, avoiding certain shoals, from 8 to 12 feet water, up to Red Fish Bar. This bar is part of a chain of islets extending from Edward's Point to Porter Point. From Galveston to Red Fish Bar about 18 miles. To Cloffer's Bar 18 miles, with 4½ to 5 feet water over its bar, which after crossing, the mouth of Buffalo Bayou is entered, and on its shores deposits of shell are to be seen. There is but little current down the bayou, which is very deep and winding. The shores or "bottom" for some distance inland are thickly wooded with pine in a sandy soil; there are other trees, but the stately magnolia with its large white and powerfully odorous flower may be distinguished. The San Jacinto falls into the bayou; at its mouth is situated Lynchburg.

Buffalo Bayou does not run far inland, but is wooded up to its



head; the lands are somewhat sandy, with loam occasionally. Houston, for the time being, is the seat of government; General Houston, the president, considering it more central for the settled districts than Austin. Houston is well adapted for trade, but I do not think it is quite so healthy as Galveston, owing to its vicinity to the timbered lands and sluggish bayou: there is no want of fresh breezes, but they are not so invigorating as those directly from the sea.

In this vicinity, and indeed in nearly all the low lands and bottoms of rivers, I do not think that the white man can be employed in the growing and picking of cotton, and thus it is to the negro we must look for this sort of labour. Farms or grazing establishments may be set on foot here by the European emigrant; but Eastern and Western Texas are the lands for the foreign settler—either for stock-raising or farming—thus leaving the low coast-lands to the cotton-planters and their negroes.

June 9th.—I travelled some 30 miles along the road from Houston to Brazoria, to the plantation of Colonel Austin at Oyster Creek. Cotton and corn looked well, although it was very dry weather. The prairies are here of a sandy nature, almost parched up, and at this moment the creeks have no water in them. The Bayou ought to be marked on Arrowsmith's map *Flues*. Deer was plentiful, bounding about the prairie, and often seen mixed with the horses and cattle. Travelling during the day is warm, but the roads or tracks are good, so that a covered gig may be used.

At Houston I saw a rich specimen of gold ore from the river Llamas, above the town of Austin—particles of the precious metal embedded in quartz. A company is about to commence operations. I may mention here that some rich silver ore has been discovered on the river Guadalupe, above the town of Seguin. From what I have already seen and heard I think I may fearlessly assert that when mining investigations shall be carried on, Texas will not be behindhand in showing forth mineral riches.

My next excursion was from Houston eastwards to Swartwout on the Trinity river. About two miles from Houston a creek is passed: in wet weather or after rains it is very deep, and travellers have to swim their horses across. It is said that there are medicinal springs here. From the creek for two or three miles the sides of the road are thickly wooded, principally with pine. The road continues over prairies with an occasional clump of trees to Cypress Bayou, 18 miles. Here there is water all the year. Cypress Bayou is wrongly laid down—the district surveyor tells me that it runs into Spring Creek above its junction with the San Jacinto river.

On the prairie at a farm, to which we came before arriving at

Spring Creek, the well is nearly 40 feet deep. Corn (maize) and vegetables looked well, stock fat, and poultry in great abundance. The prairies about here are somewhat rolling, composed of a dark soil mixed with sand, with here and there a few trees, but all around in the horizon timbered lands are seen upon the creeks and rivers, or, as termed in this country, the "bottoms."

After passing Spring Creek, slightly undulating lands are entered, covered with stately pines; the soil is very sandy, with here and there a settlement of log-houses. Sometimes may be seen in these pine-forests small patches of prairie, looking something like the park-lands in England. The settlements in this section raise corn (maize), stock, vegetables, and a little tobacco.

From the town of Montgomery to the River San Jacinto is 10 miles. No water in Atkins or Sandy Creeks, but a small clear stream in that of San Jacinto. Two miles further is Little San Jacinto River (dry). Four more miles brought us to Lindley's settlement. Here is a short cut to Swartwout, by a path E. of the main road. From Montgomery to this is well wooded, many farming locations, and pretty patches of prairie, and although it is now summer all looks green. There are still pine-lands, rock-sand, and somewhat of a broken character; the gullies or creeks dry. Leaving Lindley's farm, and passing many others, came to Winter's settlement, through a continuous forest, principally of pine and cane-brakes. In travelling in this part of the country the farm-houses are the inns. For supper, bed, and breakfast, with horses' keep, 1 to 1½ dollar. The traveller approaches the farm-house, the dogs commence barking, but at the host's command they retire with smothered growls.

*Traveller.*—Good day, sir or madam.

*Farmer.*—Good day (with a slight nod).

*Traveller.*—Can we rest here?

*Farmer.*—I expect you can.

For the first few minutes there is a general shyness; this soon wears off, and then all is right.

From Winter's settlement, travelling through cane-brakes and thick woods by a mere trail and the "blazes" or notches on trees to show the way, some 10 miles, we came to a rivulet laid down as "Big Creek." It is a fork of the last branch of the San Jacinto.\* Ten miles more came to Hubert's settlement, through cane-brakes (these cane-brakes make good cotton lands), woods of live and post oak, black-jack, and magnolia. At Hubert's the country is elevated, and from the heights the landscape is very interesting, looking from N. to S. Eight miles further on Swartwout is reached: this town stands on Trinity River. This part of the

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\* According to Arrowsmith, an affluent of the Trinity River.—Ed.

country is comparatively well settled with plantations and farms: the produce is generally sent down the river to Galveston; but, unfortunately, this stream cannot be depended upon all the year round.

I returned to Galveston by nearly the same route I had come; there had been a few days' heavy rain, filling some of the creeks with water; thus it was requisite to swim some of them.

*Population of Texas.*—The population of Texas has been very variously stated, some authorities placing it at "200,000 Anglo-American population," others as low as 55,000 souls. I offer the following in round numbers:—

White population . . . . .	60,000
Indians . . . . .	80,000
Negroes . . . . .	12,000
<hr/>	
Total population of Texas . . .	152,000

*Temperatures, Galveston.*

	S. A. M.	Noon.	P. M.	
July 1.	78	84	80	During morning, slight norther.
22.	84	86	82	
24.	78	83	82	Rain and cloudy.
26.	82	87	83	
29.	83	87	83	
August 1.	82	85	81	Morning, squalls from S. and E.
2.	74	82	78	Strong breezes from N.E.
3.	75	82	77	Ditto.
4.	75			
11.	84	80	82	
12.	85	77	81	Storm from S.S.W. at noon.
18.	79	82	80	
22.	76	82	78	Rains.
23.	78	82	79	Ditto.
24.	78	82	79	Ditto.
25.	80	83	82	Ditto, storm.
26.	76	77	80	Ditto.
27.	80	85	82	In the sun, at noon, 108°.
28.	76	84	82	Heavy rains.
29.	82	85	82	Fine and calm.
30.	82	86	82	Heavy rains and calm.
31.	81	86	84	Calm and sultry.
September 1.	82	86	84	Rain in morning, light S.W. airs.
2.	78			

The thermometer used for these observations was placed in a large drawing-room, with all the windows and doors open, but not affected by radiation from the street.



*Exports and Imports at Port of Galveston.*

	Dollars.	Cents.
It appears that the exports since the 15th January last to the 31st July amount to . . . . .	215,861	59
Imports from the 2nd February up to the same time amount to . . . . .	201,487	91
	<hr/>	
Leaving a difference of . . . . .	14,403	65

in favour of the exportations, saying nothing of the half month of exports in January. It may also be observed, that a considerable amount of the importations consist in goods, wares, and merchandize brought in by emigrants, which add so much to the wealth of the country.

The exports from Galveston have principally been cotton, buffalo-hides, ox-hides, buffalo-ropes, deer-skins, staves, moss, and sundries.

From Matagorda, about 3000 bales of cotton, and a few hides and skins.

From Red River the quantity of cotton, &c., exported unknown. But the duties on imports over Red River, from the 1st February to the 30th June, is 5984 dollars, 92 cents.

From Velasco and other points I have no data yet.

I give the following with some diffidence, but it is the nearest the truth I am at present able to offer. It is said there are 12,000 negroes in Texas, men, women, and children.

Now last year 50,000 bales of cotton were exported; this, at 7 bales each working hand, will give 7143 negroes employed in field labour; the balance, or 5857 negroes, must be considered as old men, women, and children, domestic servants, workmen, and labourers.

Negroes hired . . . . .	1,200	
Per annum . . . . .	100 dollars.	
	<hr/>	
	120,000	„
	<hr/>	
Negroes hired . . . . .	1,200	
Keep of negroes per annum . . . . .	12	„
	<hr/>	
	14,400	„
	<hr/>	

Negroes . . . . .	5,493	
Keep . . . . .	12 dollars.	
	<hr/>	
	70,316	"
Keep . . . . .	14,400	"
Hire . . . . .	120,000	"
	<hr/>	
	204,716	"
Interest on negroes at 400 dollars each	285,000	"
Interest on capital, say of 2,000,000		
dollars . . . . .	200,000	"
	<hr/>	
	689,716	"
	<hr/>	
Bales of cotton . . . . .	50,000	
Per bale . . . . .	35	"
	<hr/>	
	250,000	"
	1,500,00	"
	<hr/>	
	1,700,000	"
Hire and keep of negroes, and		
planters' own negroes . . . .	204,000	"
	<hr/>	
	1,496,000	"
	689,716	"
	<hr/>	
Remaining to the planter, to pay for		
clothing for his negroes (some few		
have overseers) and the planter's		
own expenses . . . . .	806,294	"
	<hr/>	

It is supposed that Texas will export some 80,000 bales of cotton next year; but cotton-growing is not so profitable an occupation as formerly, the prices being so low in Europe just now.

At page 392 of Mr. Maillard's work on Texas, he gives a list of assessed taxes. It is true that a bill regulating the taxes did pass the Congress in 1838, but it was found injudicious to force it, and was not carried into effect. The list of taxes found its way into the public prints in America and Europe, and, to say the least of it, was looked upon as a most extraordinary production. There are some thirty items, out of these I will mention those that were and are paid.

	Dollars.	Cents.
License for wholesale mercantile establishments . . . . .	100	0
— agents or brokers . . . . .	100	0
— tavern-keepers . . . . .	100	0
— race-course . . . . .	100	0

Dollars. Cents

Horses, valued at about 30 dollars, then at the rate of $\frac{1}{10}$		
of 1 per cent. per ann. = . . . . .	0	2
Real estate, dwelling-house and warehouses, carriages,		
&c., rate of $\frac{1}{10}$ of 1 per cent. per a. . . . .	0	12 $\frac{1}{2}$
Gold watch, per a. . . . .	0	12 $\frac{1}{2}$
Silver watch, per a. . . . .	0	6 $\frac{1}{2}$

This is about the extent of assessed taxes charged, but I doubt very much if they are all paid.

Since February last the tariff of duties has been increased, but valuations are moderate.

*Santa Fé Expedition.*—This unfortunate expedition left Austin June 18th, 1841, being composed of a military force, traders, and others, amounting in all to about 300 persons.

Mr. Falconer, who accompanied this expedition, is now on his way home to England, and will doubtless give an account to the Society of his observations. Mr. Kendall, of New Orleans, is now publishing, in the 'Picayune' newspaper of that city, a series of letters on the subject, of which, when completed, I will forward a copy to the Society. I believe that Dr. Branham, Mr. Bonnell, and Mr. Hunt, likewise of the expedition, will shortly publish their account, with a track of their course, &c.

[Mr. Bollaert had inserted at this place an outline of the course pursued by the expedition, which Mr. Falconer's more detailed account has rendered it unnecessary to insert here.]

I am informed that the journey from San Antonio de Bejar, in Texas, to Santa Fé, straight across the country, has been done within 15 days on horseback; but at any time it would not be judicious to perform the journey, on account of the Indians, unless with a strong party.

*Earthquake on Galveston Island.*—Two slight shocks of an earthquake are said to have been felt at 2 A.M. on the 22nd of August; and at 6 P.M., on the 25th, one slight shock. These shocks were so slight that but few persons noticed them.

*Positions from a Survey of the Coast of Texas by Commodore Moore.*

	Latitude.	Longitude.
	° ' "	" ' "
Mouth of the Rio Grande . . . . .	25 56 00	97 11 30
Brazos di Santiago . . . . .	26 06 00	97 12 00
Padre Island trends N. $\frac{1}{4}$ E. due 38 miles, and then N. $\frac{1}{4}$ W. due 53 miles to N. end in Corpus Christi Inlet, which has 4 feet water on its bar . . . . .	27 36 50	97 16 05
S.W. end Mustang Island { Arunsas, or	27 37 20	97 16 00
N.E. " { Coparo Inlet,	27 49 15	97 03 54
S.W. " St. Joseph's Island { 8 feet water.	27 53 00	97 03 24



		Latitude.	Longitude.	
		° ' "	° ' "	
N.E.	"	{ Espiritu Santo Inlet,	28 05 00	96 51 44
S.W.	Matagorda Island		{ 3 feet water.	28 05 56
N.E.	"	{ or W. point of	28 19 24	96 22 05
Passo Caballo . . . . .				
Decrow's Point, E. entrance of Passo Caballo,		{	28 24 00	96 20 00
in 11 feet water . . . . .				
Mouth of Cancy Creek . . . . .			28 38 00	95 57 00
"	San Bernard River . . . . .		28 51 00	95 49 00
"	Brazos River (Velasco). . . . .		28 58 00	95 33 00
S.W.	end Galveston Island (San Luis). . .		29 02 00	95 22 00
N.E.	"	(Galveston)* . .	29 18 50	94 48 30
Sabine River, W. side of entrance † . . . .			29 39 48	93 52 15

The entire coast from the Brazos di Santiago is clear, and can be approached with safety to within  $1\frac{1}{2}$  miles, except at the entrances, where the breakers always show. From Galveston to the Sabine the coast is clear for 10 miles, and can be approached within two (2) in  $3\frac{1}{4}$  fathoms water; from thence to the Sabine the land is very low, and you will not have more than 3 fathoms. 5 miles from land there is a shoal, commencing E.N.E. 22 miles from the buoy on Galveston Island, and running nearly due E. for 30 miles, having on it, in places, 17 feet water, and there are 6 or 7 fathoms in-shore of it.

The buoy on Galveston bar E. by S. from the N.E. end of the island, distant 3 miles. It is on the outer edge of the bar, in 13 feet water, and 100 yards to the E. of S., or between E. and S. you will have 4 fathoms water.

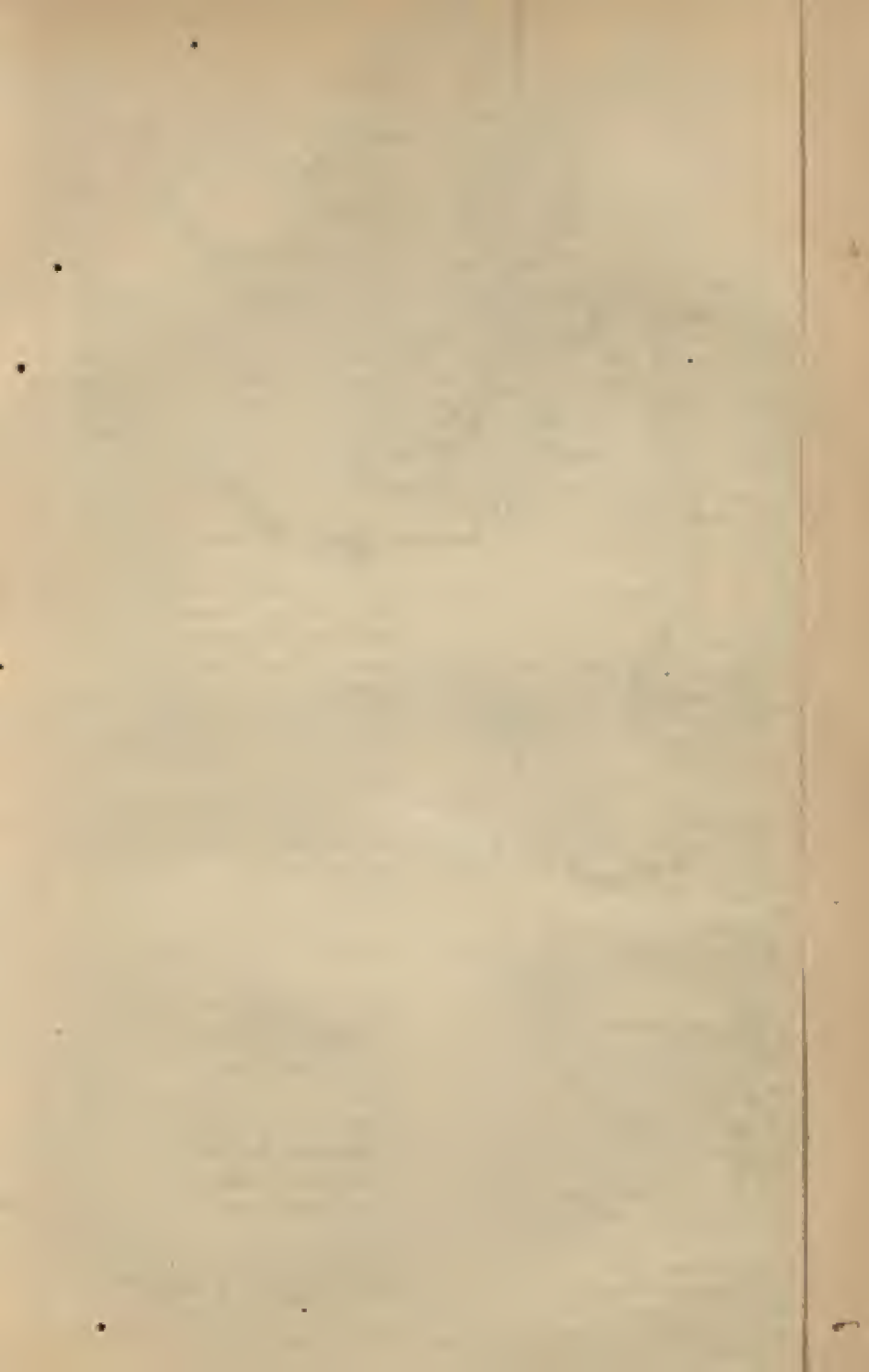
The bar and shoal run from the buoy S.W. by S., to a point from which the first house on the sea-beach bears N.W. by N., and to the N. of the buoy the shore is plain. The best anchorage is to get the beacons on the N.E. end of the island in a line, and run in to within half a mile of the buoy on the bar, where you will find 5 fathoms water.

Off Passo Caballo, the bar is S. by E. from E. of Matagorda Island, distant 3 miles; from thence it runs due W. to the island, and N. by E.  $\frac{1}{2}$  E. to the peninsula forming Matagorda Bay. There are two beacons here, but not placed right.

Commodore Moore's chart of the coast, and surveys of Galveston, Matagorda, and other bays, will, I hope, soon be published, and will be forwarded to the Society.

\* Mr. Simpton makes the E. end of the island in  $29^{\circ} 16' 37''$  lat.,  $94^{\circ} 49' 41''$  long.

† See Lee and Pillan's Survey. They make the "Mound" in  $29^{\circ} 41' 27''$  lat.,  $93^{\circ} 56' 14''$  long.







III.—*The Country between Liverpool Plains and Moreton Bay, in New South Wales.* Extracts from two Letters from Commander H. G. HAMILTON, R.N., to W. R. HAMILTON, Esq.

Collaoy, March 4, 1843.

I MENTIONED in my last that Henry Denison and myself were going to the northward in search of a new cattle station. We returned last night after an absence of nine weeks, and a ride of 1250 miles. We enjoyed it extremely, at least during the fine weather. After searching in several directions, we were lucky enough to find a good run on the Richmond River close to water-carriage. The Richmond is marked in Arrowsmith's map, though not quite correctly; it falls into the sea about 50 or 60 miles S. of Moreton Bay, and is navigable for small vessels about 70 miles from its mouth; our station is just at the head of the navigable part of the river, on the S. side, about 30 miles in a straight line from the coast, and takes in nearly 20 miles of river frontage. The whole of the country between Liverpool Plains and our new station is at present nearly a blank in the maps; but it includes some of the finest parts of the colony, and I shall soon send you a map of it, for though I had no other instrument with me than a small pocket-compass, I was able to get a good deal of information from the different settlers.

We left this on the morning of the 30th of December. Our first three days' journey took us across Liverpool Plains to the Commissioner's on the Peel River; from which the next day we went to Tamworth, the Company's station, about 30 miles higher up the Peel; and the same night we went on to the foot of the range leading to the table-land of New England, camping at sunset close to a small water-hole on "Moonbi Creek." New England, including "Beardy Plains," is a high table-land, about 150 miles in length, from 30 to 50 broad, and about 60 miles from the coast; it is a continuation of the dividing range between the eastern and western waters, and is about 4000 feet above the level of the sea. The climate is therefore very different from ours here, and more favourable for the growth of wheat and vegetables; though decidedly not so good for sheep. This table-land falls much more gradually to the N.W. and W. than it does towards the E., and the country between the lowland of the interior and the dividing range is more suited for stock than the descent towards the sea; indeed there is now very little unoccupied land left between the heads of the western waters and their junction with the Darling; and even the latter river is occupied for above 300 miles of its course. The last accounts from the Darling are very unfavourable; they are suffering severely from drought. The country immediately to the E. of the table-land

is of a different character: the rivers, after running a few miles over a comparatively level country, suddenly fall into ravines frequently 2000 feet deep, and so perpendicular as to be perfectly impassable for man or beast; at least no one has yet found a way across them. The old road from New England to Port Macquarie, after following down the leading ridge between the Apsley and M'Leay rivers, continues along the narrow gorge of the latter, crossing it above thirty times before reaching the open country. The scenery, you may imagine, is very beautiful, and the falls during the rainy season must be grand.

*March 24, 1843.*

I send with this a map of the country we passed through, with our route marked in red ink. I do not pretend that it is perfectly correct, having, as I said before, only had a small compass with me. The parts through which our road does not pass are from the reports of those living on or near the spot, and they are as correct as can at present be obtained. The latitude and longitude of "Wandsworth" may be depended upon, as I got them from Mr. Halled, whose station it is, and who had determined them by repeated observations; the positions of "Shoal Bay" and, I believe, "Tamworth," are already correctly placed in Arrowsmith's map, so that the relative positions of the intermediate places are not likely to be far out. The rivers "Sovereign" and "Severn," with all the intermediate waters, form the heads of what Arrowsmith in his map calls "Dumaresque River," but it is now known by the name of "Severn" until it joins the "Darling." The "M'Intyre River" and "Bandarra" both run into the "Gwydir," the "Bandarra" being the principal head; and the "Macdonald River" joins the Namboy. I believe it to be the same as the Muluerindie of Arrowsmith. With regard to the names, all within ( ) are those of the persons at present occupying the different stations; some of the others are the native names. None of them are my own.

To resume the narrative of our journey. From our camp at the foot of the Moonbi pass, we went to the inn on the "Macdonald" (where we breakfasted), 10 miles off; and after giving our horses an hour's rest, proceeded to Salisbury, a station belonging to Mr. Marsh, 25 miles from the "Macdonald." This part of "New England" is principally granite, of a grey colour, and coarse in the grain; the first we met with was 3 or 4 miles from the foot of the "Moonbi" pass, where in many places the ground was covered with enormous boulders, some of them resting on other stones of the same kind, but of much smaller size. The pass itself is a severe pull for loaded drays, but it is the only road on to the table-land from the S. We remained at Salisbury

one day to rest our horses, and to get a little information as to our further proceedings. Mr. Marsh recommended our going to see a station belonging to a Mr. McKenzie on "Stony-batter Creek," in the Bandarra country, which is reckoned the first step off the table-land to the westward. We left Salisbury on Thursday, January 5th, and rode through a rather uninteresting country to "Saumarez," distant 17 miles; this belongs to Mrs. Dumaresque, now in England. From thence we went to Yarrowitch, a station of Judge Forbes's, where we slept. The latter part of our road was through a very pretty country, thickly clothed with grass, though the soil did not look good, being nothing but a granite sand. We found Mr. ——— Russell in charge of the station. At the time of our arrival he was out in a small canoe fishing; but he soon came in with three fine cod—a fish that I had not before seen in the country, and only to be found in the western waters; it is a much better fish than either the mullet or perch of our rivers. On the following day we proceeded to Mr. McKenzie's station, riding through a great part of his run: we found it quite as good a country as we wanted, well watered, and the soil good, consisting chiefly of decayed whinstone. That night we went on to a Mr. Bell's station, on the "Macdonald;" he has only lately formed it, and they had but one small hut up, so, the night being fine, we took our plaids and slept out. The next day we rode through the bush to Kentucky and Salisbury, passing through a very rocky and bad country, consisting chiefly of granite boulders. We steered our course by compass, and made Kentucky within a few hundred yards. As it was still uncertain whether circumstances would admit of our getting possession of this station, we determined to look out for another; and, after remaining Sunday and Monday at Salisbury, we again made a start in company with a Mr. Thompson, whom we found living with Mr. Marsh, and who, having nothing particular to do, had offered to come with us; he remained with us till we reached the "Clarence," and we found him a very agreeable companion. Whilst at Salisbury we were told by several people that a fine country might be found to the eastward, if only the ravines of the "McLeay" or "Apsley" could be passed, and that even if we could not cross them, we might certainly head them; both of which, from what we have since learned, I believe to be impossible, at least as regards "McLeay." The "Apsley" ravines we did not see, but they are said to be of the same description as the former. On leaving Salisbury, which we did on Tuesday, January 10th, we determined to try the Apsley; but, from what we learned at Mr. Rusden's, we changed our mind and turned N. again. That evening we stopped at Dr. Thompson's, and went on the next day to Mr. Richards's, who told us that the falls



could not be crossed in any direction, and that the only way of getting into the ravine was down the old road to Port Macquarie, and that when at the bottom there was no way of ascending on either side for many miles, not indeed until the country opens out towards the sea-coast. Having heard so many different accounts of this extraordinary country, we determined to go and see it for ourselves. We left Richards's in the afternoon due N., with the intention of not returning, if we could possibly get forward; and after riding about 4 miles over a rather bad and broken country, the most extraordinary and at the same time beautiful view opened upon us. Immediately before us lay a ravine, full 2000 feet deep, if not more, in many parts almost perpendicular, and in all so steep as to afford no footing for man or beast. The rock is principally of a blueish-coloured schist, and in every other place where we met with the ravines, they were of the same rock. From the spot at which we halted, we could see about 10 or 12 miles down the ravine to the eastward, and 5 or 6 up in a W.N.W. direction, and in the whole of that distance there was no apparent possibility of either getting down or up. The opposite land, which was of the same height with that on which we stood, and not, at the farthest, half-a-mile off, appeared moderately good; but from all I have since seen, I have no doubt that the whole of the country marked "broken" in my map, is intersected with ravines of the same character, and more or less broken, leaving small tracts of good land between them; but as there is no possible way, as yet known, of reaching them, they are likely to be left for many years to come in the hands of the blacks, who do, I believe, now and then cross. Seeing the impossibility of proceeding, we returned to Mr. Richards's, and remained there that night. On the following day we determined to try what we could do by heading the falls, and for that purpose we went across the bush to Mr. Cruikshanks's, where we got a supply of damper and cheese, to enable us to remain out a few nights. We then followed down his creek for about 5 miles, when we again met the "falls." The creek that we had been following fell almost perpendicularly nearly 1000 feet. We came upon the fall so suddenly, that we were within a few feet of the precipice before we were aware we were at all near it. Here we rested for the night. The following morning, after catching our horses, we again proceeded: we had not ridden above a mile, in a northerly direction, before we came to another river, which we crossed just above its fall. The scenery about the latter was more beautiful than any we had yet seen; as fine indeed as anything of the kind I had witnessed in Switzerland. Our object was to get as far to the E. as possible; but whenever we turned our heads in that direction, we were stopped by the ravine before us; and after

passing the falls of two other rivers, we arrived a little before sunset at a cattle station of Mr. O'Connell's. The stockman living there told us that there was no use trying to penetrate in an easterly direction: he had often attempted it himself, but had always failed. He also assured us that our best chance was to the N. of the Snowy Mountains—(this name is not from there being any snow, but from their being topped with bare granite rocks, which at a distance have a white appearance). We determined to follow his recommendation, particularly as we heard there was a stockman living at Ward's station who he thought knew of a run out in that direction.

We started the following morning, and got to Hall's about noon: passing through a fine grazing country with a whinstone soil. There is no regular road from Hall's to Ward's, being only a marked tree line, and that not easy to find; so sunset found us still some miles from the latter, and we had to camp in a small gully and swamp at the foot of the Snowy Mountains. The country being very scrubby and thickly wooded, we thought it prudent to keep a watch over our horses during night, which we did by taking three hours each. The musquitos here were a great annoyance. The following day we arrived at Ward's. It turned out that the stockman, to whom we had been sent, did not know of anything worth having, but he offered to come out with us 3 or 4 days if he could get any one to look after his cattle, which had been frightened a few days previously by the blacks, and required herding for a short time to quiet them. As no one was to be found on the spot, Mr. Thompson, who had accompanied us from Salisbury, offered himself for the service, and after replenishing our stock of damper, we started the next day with our new guide. After passing another cattle station of O'Connell's, we arrived at Coutts' sheep station, in the middle of the day: from thence we ascended a high mountain to the south, hoping to get a good view of the country to the south and east. When at the top, although the weather was rather hazy, we saw enough to satisfy us that there was no open country to the south of us, or to the south-east. To the north or east we could see nothing; another mountain obstructing the view. It is said, and I have no doubt it is true, that the sea has been seen from this hill: we could not catch a sight of it on account of the haze rising in that direction. We had hardly got down, and remounted our horses, when it began to rain, and soon afterwards so thick a fog came on, that our guide lost his way. I had luckily observed our direction as we went, and with the help of my compass we soon got back to Coutts' station. The next morning being fine, we again started in an easterly direction, and spent two more days trying to push our way through a very broken and scrubby country, the rain conti-



ning to fall almost the whole time. (The frequency of rain is indeed a very striking peculiarity of the whole of the eastern ridge of New England.) We at length gave up the attempt, not being able to penetrate a cedar scrub; and thinking that even if we found a good country beyond, we should never be able to get a dray, or even stock into it; we were at one time 3 hours in the scrub, and I don't think we made half a mile in a straight line altogether. We tried also to turn it in both directions, but found it impossible from the nature of the ground. We therefore, after some deliberation, determined to return to Salisbury, and then proceed by the more usual route to the "Richmond River." We were 4 days before we reached Salisbury: and after resting one, we started again on the 24th January. Our first day's journey, 32 miles, took us to "Booralong," another station of Mr. Marsh's, from which we rode a short day of 17 miles to "Wandsworth." Here we spent the afternoon. If any settlers ought to get on in this country, the owners of the latter station certainly should not fail. The party consists of six: three Halleds and three Everetts, the two families being related; they do everything for themselves. When we arrived, one was hard at work as a blacksmith, repairing the drays for going down the country; another is a stockman, and looks after a herd of cattle; a third takes charge of the sheep, acting at times as shepherd; a fourth a carpenter; another a gardener, besides looking after the horses, of which they have a good many; and the eldest of the party keeps the accounts, and goes to Sydney to effect sales and purchases. They built their own house, sawing all the wood themselves, and put up all the fences, &c.; and they seem to be in full enjoyment of all the comforts and necessities of a settler's life.

The following day we passed Wauchope's and Boyd's, arriving in the evening at Turner's, 34 miles. Most of this day's ride was through a beautiful country, particularly after passing the range between the two former places. This range divides "New England" from "Beardy Plains," though they both form part of the Table-land; but the latter is generally some hundred feet lower than "New England." From Turner's we went to Windeyer's, 30 miles; here we had to wait three days to get our horses shod, the blacksmith who was on the station having no nails, and we were obliged to send 30 miles to borrow enough for our wants. Our next day's ride, 32 miles, was to "Tenterfield," a station of Robert McKenzie's, a settler whom I had often met in Sydney. This part of the Table-land is a good deal lower than New England—I should think fully 1000 feet, and it is said to fall still more towards the north. "Tenterfield" is only about 60 miles from Darling-downs. From this place we changed our course to the eastward; and after riding about 6 or 8 miles over



a nearly level and open country, we began to descend off the Table-land, and reached "Hindmarsh's" just before sun-set. It rained the best part of the day, the road bad, and very hilly: the distance altogether 35 miles. "Hindmarsh's" is a house of accommodation, but, as you may suppose, not a first-rate inn, being indeed nothing more than a large hut; nevertheless, as it turned out to be a very rainy and windy night, we were not sorry to get under cover. This is the only road off the Table-land leading to the Clarence, a large river, emptying itself into the sea at Shoal Bay. The next morning we again started in the rain to ride 15 miles to Evans's, at the junction of the "Clarence" and Rocky rivers, where the bad weather obliged us to remain all the following day. Being now quite off the "Table-land," we found the climate very different from what we had had for the last few weeks, and every thing growing most luxuriantly: and, from being so near the mountains, there is no want of rain. The "Clarence" here is of no great size; I do not indeed believe it to be the principal branch of the river; there are several others more to the south only dotted in the map, which must, I think, bring down a much larger quantity of water. From Evans's we went to Hogarth's, 30 miles, in the valley of the "Richmond," and there got a supply of bread, tea and sugar, to last 4 or 5 days, which time we thought we might be out in search of a good run. The whole of the country between "Hogarth's" and the "Richmond" is one immense flat, with the exception of a few low ridges. The first day we followed down "Myrtle Creek" to its junction with the south branch of the river, which we found to be 70 or 80 yards wide, and apparently deep, the water being rather brackish, but drinkable. The next day we continued down the left bank of the river for several miles, through a good country for cattle: the grass so thick that in places we could hardly ride through it, and well watered by large lagoons and swamps, the latter being covered with high reeds, which also form a fringe to most of the lagoons: one of the latter was nearly covered with black swans and wild ducks. In the afternoon we left the river, and struck across in a north-westerly direction; and about half-an-hour before sun-set, just as we came upon a small creek, where we intended to rest for the night, we fell in with a camp of Wild Blacks, with only a few women and children in it, all of whom made off as fast as they could; but we had not gone a quarter of a mile further up the creek before we fell in with another camp, containing some 20 or more men, who, immediately jumping up, with their spears, ran to the other side of the creek, where they stopped and began brandishing their arms, and putting themselves in all kinds of strange attitudes—all speaking together, and looking fierce. Not wishing to come to closer quarters with them,

we quietly rode on, taking care to have our pistols ready in case they should follow: this they did for some time, but on the opposite side of the creek. At first we did not know whether they wished to be friends or foes, but after a time they held up green boughs, which satisfied us that they had no evil intentions; we nevertheless would not allow them to approach, and wishing to get some little distance from them before we halted for the night, we continued on our way, and they soon ceased to follow us. It was so late in the evening, that we were obliged to camp not above a quarter of a mile from them; and although the natives do not generally move about at night-time, we thought it prudent to keep watch all night; but we neither saw nor heard anything more of them.

The next day we followed up the creek, till we reached the road leading from the "Clarence" settlement to the lowest crossing place on the "Richmond." We were very well satisfied with the country we had seen; but not being sure whether it might not already have been applied for, we made for Stapylton's, the nearest station we knew of on that river; we therefore followed up the road, but when we came again upon the river, we found it too much swollen by the late rains for our horses to ford it without a guide; but some five or six miles lower down, opposite to Stapylton's, we got a boat sent across for us, and our horses were swum over without much difficulty. On making inquiries as to what part of the country was still unoccupied, we were told that the whole of that lying between Dobie's and Deep Creek, immediately opposite, had been granted to a Mr. Evans; but as he had failed to occupy it within the time allowed, viz. 3 months from the license being granted, it was still vacant. That part of the land through which we rode was as good a country as we could wish to have, and we were told that the whole of it was much the same: so, without losing time in exploring further, we determined to make the best of our way to the Commissioner of Crown Lands, who lives on the "Clarence." Settlements have been established on the banks of this latter river for several years; but the country is not so fine, and does not seem so fertile or so abundant as that of the "Richmond."

From the Commissioner's, as we wished to return home as quick as possible, having been absent six weeks, we were advised to take a short cut to the south and west, leading on to the Table-land, near Coutts' sheep station, at which we had formerly been, when we retraced our steps, and returned to Salisbury. Our first day's journey from the settlement, about 30 miles, took us to the foot of the hills, where we found another station of Coutts', and bearing in the map the same name. Thus far we had no difficulties to encounter. The country between the Clarence and the foot

of the Range is thickly timbered, and presents a great variety of soil; but it is easily pervious, and the road tolerably good for horses. Much of this country, in the joint valleys of the "Clarence" and "Richmond," is favourable for the growth of wheat; and at "Foster's," a little south of the "Clarence," we were assured that the year before they had reaped 45 bushels of 60lbs. each to the acre.

From Coutts' lower station we were told we could reach the Table-land in two days—the other station of the same name being about 30 miles off in a straight line, but nearly 60 by the road; not wishing to carry with us more than was necessary, we took only a small 3lb. loaf, half a pound of salted meat, and a little tea and sugar: these last are most indispensable articles throughout this country, and particularly in the bush.

Soon after we started, the weather, which had been very fine, changed to rain; and this with fog continued more or less the whole time we were out, which, instead of being 1 night and 2 days, as we had been led to believe, was 4 nights and 5 days. The road, if you call it such, had been formed by a man of the name of Craig, about 2 or 3 years ago: it passes through the worst country it was ever my lot to travel in, and one we never should have attempted had it been correctly described to us: we were constantly losing our way, there being little or no track; and although the trees had formerly been marked with notches cut in the bark every 50 or 60 yards, most of them had grown up, or were not visible until we were close upon them; and besides the precipitous and rocky ranges we had to pass, there were five or six rivers, or rather torrents, all swollen very much with the rains, which were to be crossed. Our horses, what with the rain, rough ground, and crossing rivers, were soon completely knocked up, and we were obliged by turns to lead and drive them on. However, we contrived to reach "Coutts'" upper sheep station in the forenoon of the 5th day.

H. G. H.

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IV.—*On the Countries South of Abyssinia.*

By Dr. CHARLES T. BEKE.

*London, 23rd November, 1843.*

OF the highly interesting countries which form the subject of the present paper, the geographical information hitherto laid before the public is most meagre; and the few details that we do possess, being derived from the accounts of *single* individuals, are subject to those defects which the unsupported relations of natives of uncivilised countries always are.

That the present attempt to describe these countries may lay claim to some portion of confidence, it is necessary to explain the circumstances under which the materials were collected from which it has been compiled, and the accompanying map constructed. During my sojourn of upwards of a twelvemonth in Gojam, I more than once visited the large commercial town of Yejúbbi, which is in immediate connexion with the celebrated market of Baso, whither weekly, during eight months of the year, the Gallas from the opposite side of the Abáï resort. Here I had frequent communication with individuals of all tribes, and who had visited all parts of the Galla country and the adjoining states; and from them I obtained a mass of information, which, although sometimes differing in the minor details (a circumstance which was to be expected), is, in all the main points, perfectly consistent, and in various parts mutually corroborative.

Before entering into any geographical details, I will refer to two maps in particular, which were drawn by me under the direction of two individuals of no ordinary qualifications. The one is Goshu Zaudie, Déjazmach (or Duke) of Gojam—a prince whose friendship and protection I enjoyed during my stay in that country. By descent he is a Galla of Amura, but, like his neighbour, Sahela Selassie of Shoa, a descendant, in the female line, from the imperial family of Abyssinia—a circumstance of which he is not a little proud, since (as I have heard it stated in his own presence) he can thus trace his descent from David, King of Israel, from father to son, with the intervention only of three females. Independently of his Galla extraction, Goshu passed his childhood in the country of A'muru; and since that period has, in his military campaigns to the south of the Abáï, traversed most of the countries specified in his map. Its general correctness, therefore, can hardly be disputed.\*

\* I only regret this map is not fuller; but I had much difficulty in finding an opportunity of directing his attention to the subject, although he had often *promised* that he would give me the required information. As it was, it was not until just as we were going to part before the rains of last year, that I said he must absolutely spare me five minutes, when I succeeded in getting from him this hurried sketch.

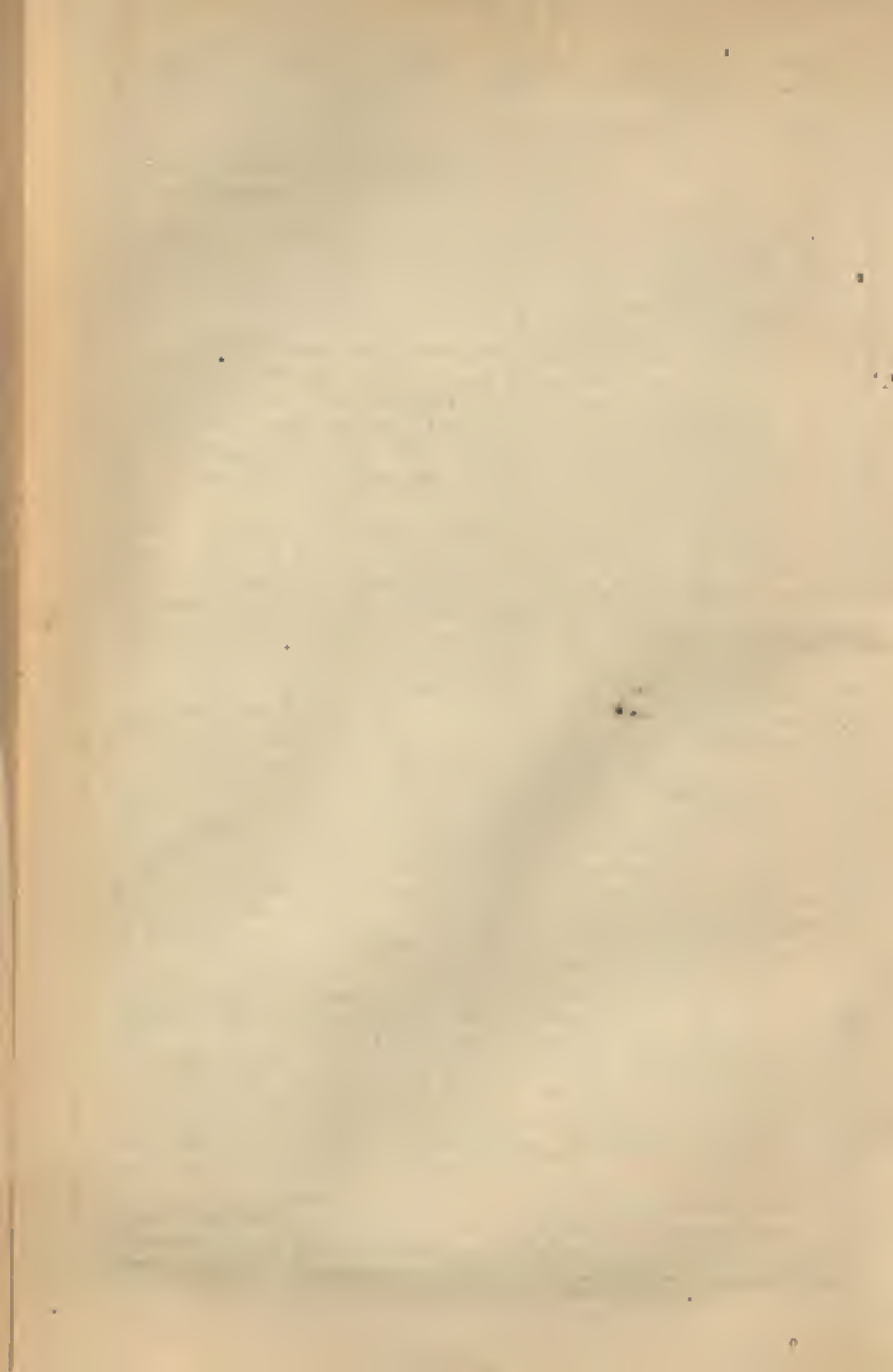
Sketch  
of the  
COUNTRIES SOUTH OF ABYSSINIA.

(from oral Information collected in Gopam.)

by  
DE BEKE.

1881.







The second map, which is a remarkable document, was obtained from a Mohammedan merchant of Dérta, named 'Omar ibn Nejât, who, in carrying on his traffic, had been beyond Kaffa, from whence he returned only two or three years ago. The positions in this map were thus determined:—He turned his back to the *Kiblah* (Mecca), which bears about N.N.E. from Yejúbbi, and placed his finger on the points marking the bearings of the places named; whereon I drew a circle round it, and set down the names mentioned within that circle.

From these two sketches, numerous caravan routes, and various other information collected by me, the accompanying map has been formed, which, whatever may be its errors, is, I believe, the first attempt to arrange the countries to the S. of the Abâi in anything like a consistent form. It will therefore, I hope, be received as a valuable addition to our knowledge of these regions.

The general character of these countries appears to be very similar to that of Shoa and Gojam—extensive undulating plains, with, in some portions, higher mountain masses, traversed by numerous streams, which at first taking their course over the elevated plateau are but insignificant brooks, and then falling abruptly through a wild mountainous country, become rapid torrents, the union of which form rivers of magnitude. The countries of Hither Jimma, Nonno, and Guma in particular, are described as extensive plains producing *barley*, which speaks for an elevation of from 7000 to 8000 feet. Chétea, and the districts to the S. and E., as also Sibü, Gomma, and Kaffa, are said to contain more elevated regions, similar to the Tálba Wáha and Yékandach mountains of Gojam. Wallégga is an extensive plain and (in great part) desert country, stretching far to the W., and extending to the river Báro. Between Wallégga, Guma, Gera, and Kaffa, lies a vast forest, through which the caravans going to the last-named country must pass. The merchants describe it as impervious to the rays of the sun, which is not seen, they say, for four or five days successively. In this forest, and in its immediate vicinity, are the heads of the Gojeb, Gaba, and Dedhésa, the first of which streams is but a small brook where it is crossed on one of the routes from Guma to Kaffa. This forest appears to extend westward and northward through Wallégga, and eastward to Enárca, in which country my first informant, Dilbo, describes the Gibbi known to him as rising in a large forest.

Although most of the Galla countries are without any settled form of government, it is not to be imagined that they are in a state of anarchy. Each tribe has its own chief, ruling districts of greater or less extent, whose authority, it is true, is rather suited for and exercised in times of war than in those of peace, when the traditions of the nation, as preserved by the elders, and public

opinion, have more to do with the government of each tribe than the will of the *abba-dáda* or chief—literally, *warrior*. In Enárea, Guma, and Kaka Jimma, however, regular hereditary governments exist, in which the absolute power is vested in the hands of a sultán or king. The same form of government prevails in the neighbouring countries of Kaffa, Worátta, and Jánjero, where the kingly power is exercised in its fullest extent; and as hereditary monarchy does not appear to be an indigenous institution amongst the Gallas, it is not improbable that this state of things in these southern countries may not have been without influence in producing the like among the southern tribes of the invaders, after they had settled down in the provinces torn by them from the Ethiopian empire.

The districts immediately skirting the Abáí, which are partly in the valley of that river and partly in the plain above, are more or less on a friendly footing with the rulers of the peninsula of Gojam, to whom most of them pay tribute. Amuru, in particular, is principally under the rule of a powerful chieftain named Ado Ibsa, who has also subjected to his power, in great part, the neighbouring districts of Horro, Jidda, Hébantu, and Limmu. Being related to Dejach Goshu, he was some years ago induced to acknowledge his supremacy, receiving from him the title of Fitaurári, with the grant of a portion of Shínasha, on the N. side of the Abáí; but he has lately rebelled; and at the time I visited Shínasha, the disaffected, whom I have in my Journal described as crossing the river to avoid the payment of the duties imposed on them, found a friendly reception in the territories of Ado Ibsa.

Beyond Amuru, to the westward, are Hébantu and Limmu (called Limmu-Sobo, to distinguish it from the Limmu of Enárea), the position of which countries was determined by me on my visit to Shínasha in December, 1842. Beyond these is an extensive desert tract called Hándak, through which flows a large river joining the Abáí. This river, in its position, coincides with the Yabus, and is, therefore, probably the Dedhësa in the lower part of its course. This river was by some named to me as the *Abáí*; and in fact I could learn no other name for it, except that one person stated it bore the same name (Hándak) as the desert country through which it runs. We have here, beyond all doubt, the *Habahia* of M. Jomard's informer, Ware (Ouaré), with his country Limmu adjoining Hébantu,—which must evidently be the case from the allusion to both of them together in one of his war-songs,—and with Sibú and Leka beyond them on the one hand, whilst Wámbera (the position of which I determined on my journey into Agaumider in March, 1842) lies next them towards the N. I may remark that Sibú and Leka are portions of Obo, or Wobo, and that the Gibbi rises in the former district.



The tribes of Gúderu and Hither Jimma, on account of their connexion with the market of Baso, find it to their interest to keep constantly on good terms with their neighbours of Gojam. The friendship of the Miécha (Mächa or Meeha) tribes of Kuttai and Liban, on the contrary, is very doubtful; and whenever they fancy they can do so with impunity, they make inroads into Gúderu and Jimma, or across the Abäi into Gojam, as was the case when I was in that neighbourhood last year.

The caravans from Baso to Enárea, after passing through Gúderu and Jimma, enter Nonno, which is an extensive and level country, in great part desert, inhabited by hordes of horsemen of warlike character and without regular government, with whom the king of Enárea is generally at war. It is in Nonno that the Káfilahs find the greatest obstacles, being frequently detained several months, as was the case during the last season of 1842-3, when, for four months previously to my departure from Baso (in February, 1843), all communication between the two countries was cut off.

The Enárea of the present day forms apparently but a small portion of the country to which that name was formerly given. By geographers it is generally stated that Enárea is still a Christian state; but this is an error, arising probably from the fact that the Christian inhabitants of the country were for a time able to resist the pagan invaders. But it is nevertheless certain that the Limmu tribe of pagan Gallas long ago made themselves masters of the country, which they still continue to hold in subjection. Hence the names of Limmu and Enárea are used as almost synonymous. They have, however, since turned Moham-medans. Enárea is a *wéina-dágga*, i. e. a lower degree of the elevated plateau suited to the growth of the vine. Dilbo compared its temperature to that of Aliu Amba, near Ankober, the elevation of which was determined by Mr. Kirk and myself to be 5271 feet; and numerous merchants assured me that it is a much warmer climate than either Gojam or Shoa, so that its lower elevation is unquestionable. The rains begin there in April, and the rivers are full by June. At the end of July or the beginning of August the *dhiirrah* (ذيرره not ذرره) harvest begins, which is not the case in Gojam till September. Enárea is principally celebrated for its extensive woods of coffee, the chief locality of which is the valley of the Gibbi, close beyond Sakka, the great emporium of the kingdom. These woods are described as containing trees, the trunks of which are from 2 to 3 feet in diameter—a size far exceeding anything of the kind elsewhere. They are the property of the king, and are watched by his slaves. The coffee crop begins in the month of December; and the female slaves of the king go from Sakka to get it in,



setting off in the morning and returning loaded in the evening. The price of the article at Sakka is very low: it has been stated to me as varying from 7 lbs. to 15 lbs. per amole (piece of rock-salt). However, I believe it is usually sold by the ass or mule load. A Christian servant of one of the principal Mohammedan merchants of Yäush told me that having received from his master two dollars as wages, he bought with them at Sakka four ass-loads of coffee, together with the beasts which carried them, with which, returning to Baso, he set up as a trader on his own account. But I was informed in another quarter that it is most customary to purchase it from the king by the *mule-load*, the price of which is about one dollar, without limitation as to the quantity of the load, the beast being allowed to take as much as it can possibly move under, provided only it bear its burthen beyond the limits of the market, when it may be at once unladen. Such being the only standard, it will not appear surprising that it should have become customary to train many large and powerful mules for the *market*, in order to let them out on hire; and it is asserted that one load so purchased makes two ordinary ones. It may be remarked here, that, independently of what comes from Enárea, there is very little coffee produced for the purposes of commerce. In Jimma and Kaffa small quantities only are found, as likewise in the valley of the Gojeb. In Wallégga, in the valley of the Gaba, there is said to be a good deal; but it does not appear to be made use of.

The approach to Enárea from the N. is at *Kella*—a word of frequent occurrence, which has the same signification as the Amharic *ber*; viz., a gate or pass,—which is defended by a ditch and fence; such a fortification being rendered necessary by the predatory character of the inhabitants of the country of Nonno previously mentioned. The king is said, however, to have subjected many of them to his dominion. He has a few Abyssinian (Tigre) gunmen in his service, the Mohammedan merchants having succeeded in conveying to him several matchlocks and pistols. Enárea was till lately at war with the neighbouring countries of Jimma and Guma; with the former to much disadvantage. But peace has now been established between the monarchs of the three kingdoms, which peace has been cemented by their union by marriage, and still more by the adoption of Islamism by the kings of Jimma and Guma. In Enárea this religion has long since usurped the place of heathenism; this country being the principal place of residence of the Mohammedan merchants of Abyssinia, whose precepts and example have had, and still continue to have, most surprising results in the conversion of the Gallas. The inhabitants of Enárea enjoy the reputation of being the most civilised of all the Gallas; and manufactures flourish here

in a higher degree than anywhere else in this quarter of Africa. I have seen daggers with well-wrought blades and ivory handles very elegantly inlaid with silver, as well as cloths with ornamented borders, brought from Enárea, such as would in vain be looked for in Abyssinia. But it may be remarked that throughout the Galla country, of which Shoa may be regarded as a part, the state of manufactures is much superior to that of Abyssinia, properly so called. Enárea is of most importance to Europeans as the main source of the trade of Abyssinia; almost all the coffee, and a large proportion of the ivory and slaves brought to Baso market, and thence carried by the Kafilahs (كافل) northward and eastward, being the produce of this country. Baso appears to be the only mercantile outlet that Enárea possesses. From Shoa, merchants are said to go thither occasionally; but there is no regular trade between the two countries.

The king of Enárea is named Ibsa, but he is better known as Abba Bógibo, *i. e.* "the master of Bogibo" (his favourite war-horse), such being the Galla mode of distinguishing their chiefs.\* He is described to me as being somewhere between forty and forty-five years old, and as remarkably fair. His father's name was Bófo, surnamed Abba Gombol; and his eldest son and heir apparent is Sanna, or Abba Rago. Abba Bógibo's principal residence (he has seven in all) is in the immediate vicinity of the large market town and capital of Enárea, Sakka.

Guma adjoins Enárea to the W., being of less extent and less powerful than that country. It is governed by Abba Rebu. The inhabitants of Guma were more than those of any other country doomed to slavery; as their sovereign, who has the character of extreme severity, is in the habit of selling whole families for offences—sometimes of the most trifling nature—committed even by a single individual. But this custom has diminished very considerably since Abba Rebu's adoption of Islamism, as his example has been followed by the greater part of his subjects, who have thus placed themselves under the Moslem law. The capital of Guma is Gombáta.

Sanna, surnamed Abba Jifár, the king of Kaka Jimma, is the most powerful of the Galla monarchs, and his dominions are very extensive, having been much enlarged by acquisitions lately made at the expense of Enárea, as well as in the south and west.

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\* The Christian princes of Abyssinia have frequently three names. For example, the present Dejatchach of Gojam is called *Gashu*, *i. e.* "the buffalo," as his family name, that is to say, the name given him at his birth by his father or mother, by which he is generally known; secondly, *Sáhela Yénu*, "the mercy of Jesus," which is his Christian name; and thirdly, *Abba Kanuu*, "the master of Kanuu," by which name he is called by his soldiers and in times of war. *Zidúle*, "my crown," is his father's name.

His father was Dángila, surnamed Abba Nagál. Abba Jifár has a much better reputation than Abba Bógibo among the merchants, who describe the latter as grasping, while the former is liberal. But the position of Enárea gives it advantages, as regards the commerce with Abyssinia, which Jimma does not possess; added to which Jimma produces very little coffee. From its extensive conquests, Jimma is a great slave-dealing country, the people called Sidámas (of whom I shall speak hereafter) being chiefly brought from thence. Folla, or Polla, a town within the dominions of Abba Jifar, is notorious as being the place where young male slaves are mutilated in order to qualify them for attendants in the harems of the great.

Jánjero is a country of which the imperfect accounts hitherto obtained make one, from their strangeness, only the more desirous to learn something further respecting it. The government appears to be not merely an absolute, but a most capricious despotism. I was told that all the male inhabitants, except the monarch and his children, are mutilated, having the two breasts cut off and one of the testicles extracted, in order that they may be disqualified for reigning. The tanners and (I believe) other inferior castes—for the distinction of castes prevails here, as in Abyssinia—are not included; the strange reason for their exemption being, that as they are not freemen of a high caste, and consequently no one would submit to their rule, there is no fear of their aiming at the government. At Yejubbi, during my last visit, I saw, previously to having been made acquainted with this custom, a couple of Jánjero lads, whom I immediately sought up in order that I might by personal inspection ascertain the truth of what I had been told. One of them had already been bought by an agent of the king of Shoa, and had been dispatched to that country; the other, who was still there, had his breasts unmutilated, he being, they said, a tanner's son; others said he was too young, being only nine or ten years old, and that operation is not performed till the age of twelve or thirteen. But the poor child was a complete eunuch, he having passed through the hands of the barbarians at Folla. The price demanded for this lad was 40 dollars, which sum had been paid for his companion by Sabela Selassie. I was repeatedly assured, however, that the custom already described actually prevails in the country. The two individuals whom I thus saw, as well as many of the others, principally females, from the same country, whom I had seen on previous occasions, were the fairest of all the slaves brought to Baso; and the inhabitants of Janjero are so in general. Still there are some of darker complexion among them, as I have myself had opportunities of observing. The native name of this country is Yángaro, as I have heard from the mouths of several natives;



Janjero being the Galla pronunciation of the word, as Zinjero is the usual Abyssinian appellation. The king's name was given me as *Amno*; but I have reason to believe that this is an appellative, and not the monarch's proper name. The inhabitants of Janjero are pagans, being neither Gallas, Sidamas (Christians), nor Mohammedans: and their language is quite different from those of the surrounding countries.

Janjero is a higher country than Enárea, producing barley; but there are lower portions in which coffee is found. The food of the inhabitants is the *enset*, as in Kaffa; in speaking of which country I shall have occasion to describe more at length the exclusive use of this esculent vegetable. They eat, moreover, the flesh of oxen only; not that of sheep, goats, fowls, or, in fact, any other animal. Another curious custom of Janjero must be particularised. The people are subject to the tape-worm, like the Abyssinians, but the king alone drinks *kosso* in order to expel it: his subjects make use of a certain grass, as they must not employ the "king's medicine."

Kucha appears to be the same as Kuchash, which is described as a Christian country, entirely surrounded by pagan Gallas. I am informed that the people of Kuchash send priests to be ordained by the Abun or Bishop of Abyssinia in the second year after his arrival at Gondar, that is, as soon as possible after the news of his arrival has reached them. When the priests return home to their country, they are not permitted to touch the ground outside of their houses, but are carried by the people to and from the church. It is a well-known fact that before the invasion of the Gallas the greater part, if not the whole, of their present country was occupied by Christians. Independently of the general tradition to that effect, they still preserve in Gojamarks brought from Gandéberat, &c., when those places were invaded by the Gallas. A Túloma Galla informed me that in his country they are acquainted with three Christian states, which they distinguish as Sidáma Gojam or Sidáma Goshu, Sidáma Sahelu, and Sidáma Bótora; the first meaning Gojam governed by Dejach Goshu, the second Shoa governed by Sahela Selassie (of which name Sahelu is a common contraction), and the third, as I apprehend, Kuchash, which is in the immediate neighbourhood of—perhaps subject to—the Galla country of Botor. My informer was of opinion that Sidáma Bótora means Kaffa, but I think erroneously; since he could scarcely have known even of the existence of the latter country previously to his arrival in Gojam; besides that he himself stated that his countrymen, the Túlomas, are personally acquainted with the people of Sidáma Bótora from coming in contact with them sometimes by the way of Wóreb.

Sidáma is a term which is usually applied to Christians in

general, although at Baso I have heard it not unfrequently given to people who certainly do not profess our religion; and I have heard it explained as meaning the natives of countries beyond the land of the Gallas, who are of a different race and speak a different language; and the slaves from Kassa, Worátta, Wolámo, &c. appear to be all known in the market as Sidámas, without regard to their religion. Still Janjero is never so named.

Respecting Wolázza—this is the native name, Wolámo being the Galla designation—I have not been able to learn any particulars, except that it is on the way to this country, and not between Jimma and Kassa, that the Gojeb is crossed in boats. Worátta, which lies farther to the W., towards Kassa, is a very extensive tract under the rule of a king who is a pagan, as are the greater part of his subjects. But Kika and the more eastern portion of the dominions of the king of Worátta are for the most part inhabited by Christians. Natives of that country with whom I have spoken say that their countrymen are of all shades of colour, like the Abyssinians; but all those whom I have seen are, as a race, unquestionably of a much darker complexion, partaking too, in a slight degree, of the negro physiognomy. The merchants of Baso do not visit these countries, with which they have no trade, and where, they say, they would be sure to be murdered. The slaves are all either taken in war, or purchased as culprits with their families, such being a common mode of punishment throughout these countries.

Kassa is the next tract to be mentioned, respecting which country my information is principally derived from 'Omar ibn Neját, the merchant of Derita already mentioned: the main particulars were, however, confirmed by others. It is described as a Christian state, more extensive and powerful than any of the Galla kingdoms before enumerated. The title of the monarch is Tháto, meaning king. The present Tháto is named Gehanécho—another informant called him Biédde—and his capital is Bonga. His rule is quite despotic, and his power and wealth surpass those of any ruler of Abyssinia, not excepting Rás Ali and Sahela Selássie. "He has two chiefs under him," said 'Omar, "styled Chabaráso and Katabaráso, each of whom is equal to Rás Guksa," the present Rás's grandfather. This expression is intended to convey the idea of this monarch's extreme power; since Ras Guksa, the founder of the existing dynasty, is looked up to as without equal in Abyssinia. The Tháto of Kassa, like Sahela Selassie and Goshu Zaudie, claims to be descended from the imperial family of Ethiopia.

There are only six—another informant said eight—churches in the kingdom, although so extensive. The distance of these churches from each other was compared with that between Dima,

Yaush, Démbecha, &c. in Gojam, or as being yet greater. This seems to show that, like the churches of these latter places, they are a species of abbey or convent, the towns in which they stand belonging to the churches, and being sanctuaries or "cities of refuge," like those of the Israelites. When the Thato dies, his body must be carried "a week's journey" to one of these churches, which is the usual place of sepulture of the monarchs. In Kassa, as also in all the countries to the S. of the Gallas, including Janjero, it is considered improper to eat *grain* of any sort—in fact 'grain-eater' is a term of reproach—the vegetable food of the people consisting entirely of *enset*, which is cultivated in vast quantities. They have, it is true, wheat, barley, tiéff, beans, and other kinds of grain and pulse; but all of these are used only for making beer, or as food for the cattle. In like manner, as in all the other countries above mentioned, the ox is the only animal used for food; but in Kassa fowls also are eaten, which in Janjero at least is not the case. The eating of fowls in Kassa is, however, only allowed to males, as should a female partake of this article of food she is immediately sold as a slave. It is to be remarked that the people of Kassa deal in slaves, although Christians, which the Christians of Abyssinia do not, with the exception of those of Agaumider in respect of their Shankala captives. In Kassa to wear leather in any form is improper. The higher and middle classes of the people wear cotton dresses; but the poorer weave the filaments of the *enset* into a coarser article of clothing, which is very durable. The inhabitants of this country are on the whole well off, and many of them are extremely wealthy. The currency consists of pieces of rock-salt brought by the Sennâr merchants by the way of Wallegga, and common glass beads, thirty of which are equivalent to a piece of salt. Dollars are not known, except perhaps in the Thato's house. No gold is found in Kassa, but it is brought thither from the neighbouring country of Siékka. There is coffee, which grows wild in forests, and also *chât* or *kât*\* (tea?) and *horarîma*, a species of coriander (?), which is brought in tolerably large quantities to Baso from this and other places, and exported to India by the way of Massôwah. The civet of Abyssinian commerce comes principally from Kassa, but small quantities of it are produced in Jimma, Enârea, Guina, and Gera. In Kassa there is no dry season: it rains more or less throughout the whole year, so that there is grass at all seasons, with a constant succession of crops. To use 'Omar's words, "the harvest lasts all the year round." The males are circumcised and the females excised. This appears to be the prevalent custom throughout all the nations of this part of Africa, with the exception of the

\* *Kât*, the favourite intoxicating drug of the Arabs. See Niebuhr's Travels, &c.; De Sacy's Chrestomathia.



Gallas, among whom the males are not circumcised. The Thato has not the exclusive use of the *hosso*, as his royal brother in Janjero, but his subjects may physic themselves after the usual Abyssinian custom. Grain-salt (*A'shabo*) is brought to Kaffa from the Indian Ocean by the way of Gobo, Worátta, and Doko. My informants were very precise and positive on this point, saying that the sea is very near to Doko, and that it is that of the Banians, with whom and with whose country (Hind) they are acquainted, from having traded with them in the ports of the Red Sea. On my suggesting the possibility of this salt being brought from Lake Assal by the way of Hárrargie (Hurrar), I was assured that such is not the case, the direction of the two roads being quite different.\*

Of the countries beyond Kaffa to the S. and W., 'Omar and an Abyssinian of Galla extraction, named 'Ali ibn Mohammed, are the only persons who could give me any information, and what I did obtain from them is very scanty. Suro is 2 days' journey to the W. of Bonga, and is subject to Kaffa. The country is both highland and valley, but the people are all shankalas, or negroes. The men go naked, and the women wear only a small apron. The king of the country alone is clothed. They are pagans. They take out two of the lower front teeth, and cut a hole in the lower lip, into which they insert a wooden plug. They also pierce the gristle of the ear all round for the insertion of grass. Like the rest of the people to the S. of the Gallas, they only eat the flesh of the ox. Beyond Suro is Siékka, a week's journey from Bonga; but so far my informants had not been. They say that in times of war the Arabs come to Siékka and Suro to fight with the people, and in times of peace to trade. The only articles

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\* In pp. 77-83 of the second volume of the 'Highlands of Ethiopia,' by Major Harris, published shortly after this paper was read, is a description of an important and extensive kingdom said to be beyond Kaffa, and named *Susa*, the religion of which is Christian, its capital being called *Bonga*, and its monarch *Heddoo*, who is described by the author as being at war with a neighbouring tribe of negroes called *Souriss*. In the description of Kaffa given above, these very particulars related by Major Harris respecting *Susa* are ascribed to *Kaffa*, its capital being *Bonga*, its king's name (according to one informant) *Heddoo*, its religion Christian, and its negro neighbours *Suro*. It seems to follow, therefore, that *Susa* and *Kaffa* are the same: in other words, that *Susa*, as a separate kingdom from *Kaffa*, has no existence. In corroboration of this conclusion, the authority of two other travellers is to be cited, both of whom agree in making *Bonga*, the capital of Major Harris's *Susa*, to be that of *Kaffa*. The one is the Rev. Mr. Krapf, who in the volume entitled 'Journals of the Rev. Messrs. Lumsden and Krapf,' recently published, p. 258, says, "the capital cities of *Kaffa* are *Dentah* and *Bonga*." The other is M. d'Abladie, who in the 'Bulletin de la Société de Géographie,' tom. xiv. p. 430, says, "Il n'y a pas de montagnes dans *Kafa*; sa principale ville est *Bonga*, la plus grande qui existe en Éthiopie." When we come to obtain further information respecting these still unknown regions, it may possibly be found that *Kaffa* and *Susa* are different names for the same country, or that they are separate provinces of one empire. For the present, all that can be done is to assert their general identity.

they bring with them are beads of various sorts, in exchange for which they take only slaves and gold. The country produces ivory, but no coffee. 'Omar says that *many* Arabs come to Siékka and Suro, if the way is good. These Arabs he explains as being Mohammedan merchants from Ginjar, called also Tuháris (*pl.* of Tehrúr), who come by the way of Wallégga. I have on a former occasion mentioned that Ginjar corresponds with the Abu-ramla (أبو الرمل) of the maps.

It is further to be mentioned, but on the authority of 'Omar alone, that beyond Kassa is a country called Derbádlo, the name of whose king is Galligáso; next to which is the country of Mocha, whose king is called O'go; and then again a third called Afillo, of which the king is named Gimbi. The inhabitants of all these countries are Christians, and their languages resemble that of Kassa. Afillo is stated by 'Omar to be beyond the river Baro: from routes furnished to me by several Gallas, in which Afillo is named as a Christian country surrounded by Gallas, its position would, however, appear to be to the east or northward of that river. But the information in this respect is so very vague, that it is not possible to say more than that the general direction of these countries from Kassa is probably to the W. or N.W.

I have not yet spoken of the languages of Kassa, Worátta, and Woláitza. As appears from vocabularies which I have collected of these tongues, they are closely connected with each other, and—what is most curious as concerns the past history of these countries—cognate with the Gonga language still spoken in a portion of Damot, on the northern side of the Abáí. Hence it is not unreasonable to conclude that, previously to the irruption of the Gallas, one single language in various dialects prevailed throughout the table-land now occupied by these invaders as far eastward as the limits of the dialects cognate with the Amharic, which—at least at the present day—would appear to commence in Gurágie or thereabouts.

With respect to Doko, both 'Omar and 'Ali entirely confirm Dilbo's account of the natives of the country climbing up trees with their feet first. They explain it thus:—In that country there are very tall slender trees without a single side branch, in the heads of which trees the bees deposit their honey. To reach this treasure the people tie the two ends of a rope round the stem of the tree at a little distance from each other; then encircling the tree with their legs, and preventing themselves from slipping down by resting on the higher end of the rope, they, with their heads and hands downwards, untie the lower end, which being fastened a little further up becomes in its turn the higher one. Thus alternating the ends of the rope, they at length reach the summit of the tree, from whence, having obtained the sought-for

prize, they slip down with the feet foremost. In a memoir on these countries, read by the Rev. I. L. Krapf before the Egyptian Society in Cairo, a translation of which has appeared in the *Monatsberichte* of the Geographical Society of Berlin, Vol. iv., p. 181, it is stated, on information subsequently obtained from Dilbo, that the people of Doko are *pigmies*, and some remarkable particulars are given respecting them. I confess, for my own part, that neither of my informers made any allusion to so curious a fact; and it is to be remarked that in a paper on the Countries to the South of Shoa, by M. d'Abbadie, in the *Bulletin* of the Geographical Society of Paris for last June (vol. xix. p. 439), which I have just seen, it is stated, on the contrary, that the natives of Doko are very large and muscular—"très gros et bien musclés, absolument comme les Sawáhily." M. d'Abbadie adds, that the language of Doko has some resemblance to that of Woráta; consequently, to that of Kaffa likewise.

With respect to the information furnished to me by 'Omar, I am bound to say that I have every reason to give him credit for veracity. He answered all my questions with the greatest readiness, explained cheerfully any apparent discrepancies, and sometimes called on me to say that he had been speaking to 'Ali (who frequently took part in our conversations), and found that he had been mistaken in something he had told me, &c. The people of Déríta are perhaps better informed than those of any other place in Abyssinia, from their being the principal merchants, and being in the habit of visiting all the surrounding countries. "Where is the land," said 'Omar, "that a *Déríta lij* (a child of Déríta) does not reach? We would go beyond Kaffa, if the kings of that and of the adjoining countries would allow us to pass." This latter assertion he repeated on my questioning him as to the possibility of getting across the continent from Kaffa, which he said was quite out of the question, owing to the constant wars. On my asking whether there was no commercial road westward, he said "certainly there is, by the way of Wallegga;" but this he explained as leading towards Sennár, consequently northward in the result. Directly W., he says, there is none. With Doko to the S.E. there is plenty of communication among the natives.

This introduction was necessary before proceeding to the consideration of a curious question to which 'Omar's map gives rise: it is, as to the course of the River Gojeb. From Dilbo's original description of its course I was led to believe that its outlet is in the Indian Ocean, and that, as I expressed myself on first sending the information of its existence to this Society, in 1841, "it would be found to afford another high road into the interior of Africa;" and this direction of its course has been confirmed by several other



persons. But 'Omar distinctly states that the Gojeb and Gibbi, after uniting in Doko with another river from I'fat (i. e. Shoa), the name of which he does not know, go round westward and northward and join the Abāi, which latter river he represents as making a curve beyond Wallegga after passing Agaunider. This last part of his statement manifestly arises from his ignorance in such matters, and therefore ought not to be allowed to weigh against his positive assertion of facts within his own knowledge. He positively states that he has been through Suro and to the frontiers of Šiékka; that beyond this latter country the Gojeb joins a large river known there as the Abá of Sennár; that it is an immense river, a day's journey across. This river of Suro, he says, is called Goje; and although he did not reach it, he was near it. This he repeated on my expressing my impression that he was in error, adding, "I am not mistaken; I have not forgotten. When I do not know a thing, I say I do not. Why should I tell you untruths?"

In collecting geographical information from natives, the point attended with the greatest difficulty is as to the direction and course of rivers, as I have experienced not in a less degree than other investigators. Dilbo, at the same time that he informed me the Gojeb went to the S.E., said that the Gibbi ran in an opposite direction. At Baso, previously to my last visit, after my return from Slimasha, the weight of evidence certainly led me to the belief that both these rivers, as well as the Gaba and Baro, run to the N.W., and I went so far as to imagine that they might join the Bahr el Azrek, forming in fact its principal stream. Now, however, that I have obtained further, and, as I conceive, more correct information as to the precise position of the sources of the Gibbi, as well as of the Gojeb, there is no alternative but to make them both run to the S.

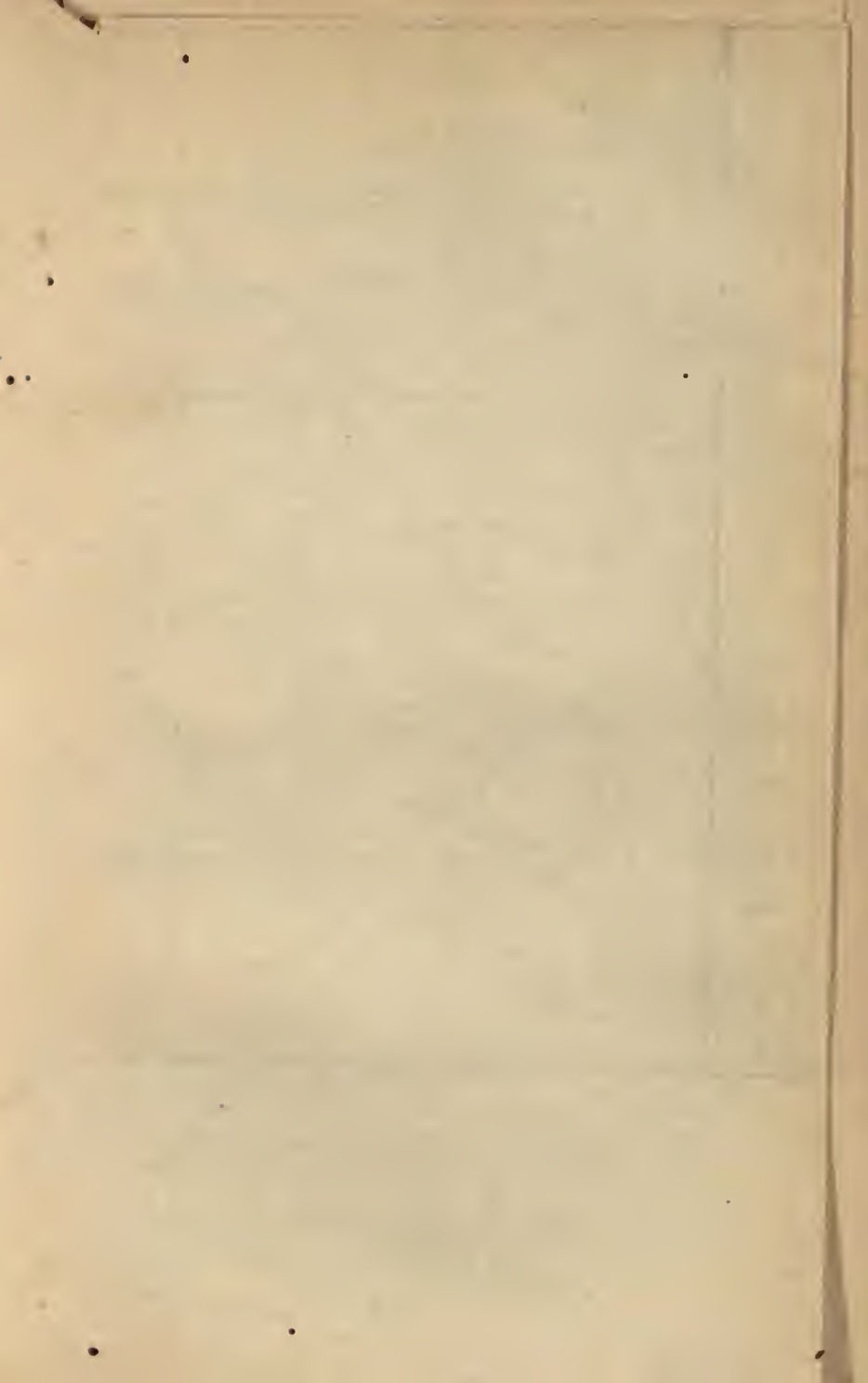
The circumstance that the river beyond Limtu, which is assumed to be the Yabus, was by some of my informers called Abāi, shows how easily a (no doubt) frequent cause of error may originate. We have here two rivers of the same name. A third will be the Gojeb itself, which where crossed between Kaffa and Jimma I have heard called Abá; and 'Omar gives a fourth when he says that the name of the river beyond Wallegga is Abá! Assuming that 'Omar is not correct as to the fact of the Gojeb running westward past Suro, and that it is an affluent of which he is speaking, we have a second example of two rivers called by nearly the same name, Gojeb and Goje. And a third instance of this is afforded by the Gibbi, which name is given to three streams laid down in 'Omar's map, one in Hither or Tibbi Jimma, the second in Enárea, and the third in Further or Kaka Jimma. The proofs, independently of 'Omar's statement, of the separate existence of these three rivers, are so clear and positive

that I dare not reject them; and I have just seen that M. d'Abbadie likewise states that the Gibbi (or, as he writes the name, Göbe) has three sources, of which two are in Enárea (see 'Bulletin,' vol. xix. p. 439). From all these examples it would appear to result that the names Abáí, Gojeb, and Gibbi, independently of their application to the rivers to which these names are properly applied, are also used to designate some of their principal tributaries. In confirmation of this, I will cite an instance coming within my own personal knowledge. The Chée in Eastern Gojam is divided in its upper course into two separate streams, which both bear the same name, and are only distinguished when necessary by the additions of "Enát" and "Gílgál," i. e. mother and foal (or child).

But to return to the Gojeb. As far as Doko the course of this river southward is sufficiently determined. Below this ought 'Omar's statement to be taken literally? or, supposing his Goje of Suro to be an affluent of the Gojeb, may not his veracity and general knowledge still remain unimpeached, if we consider that as the former river must then have its source in the tract in which the Baro (a tributary of the Bahr el-abyad) also rises, it may, quite in conformity with native phraseology, be said to *join* it? The map of the Bahr el-abyad, in a late number of the 'Bulletin' of the Geographical Society of Paris (vol. xix. p. 176), is, however, certainly in favour of the former conclusion.

It remains for me to mention the Baro and Gaba, two rivers of Wallegga, which, as I have before mentioned, is a name applied, apparently very indefinitely, to an extensive tract of desert country to the westward, abounding in elephants. This country is traversed by the Gaba, which has its head towards the S.E. in the same large forest in which the Gojeb rises, and unites with the Baro towards the N.W. The Baro itself has its sources at a much greater distance to the S., and is described to me by several informers as "a very large river," "much larger than the Abáí." Some people of Gúderu informed me of military and elephant-hunting expeditions undertaken by their tribe as far as the Baro, the distance gone by them being 14, others said 16 and 17, days on horseback.

As far as the Baro various tribes of Gallas are spread over the country, all speaking the same language as that used between Gúderu and Enárea. The valley of the river is said to be inhabited by shánkalas, or negroes; but beyond them to the westward are other tribes of Gallas speaking a different language, or at least a different dialect. Where the original country of the Gallas was, is still a *rexata questio*. It is frequently said that they came from the E. or S., and this I have heard asserted at Baso; but some persons there stated, on the contrary, that the







The  
URAL MOUNTAINS  
(from 51° to 60° N Lat)  
compiled from  
Various Russian M.S. Maps,  
as well as those of Humboldt, Hedenstam &c.  
By  
Rodnick I. Murchison VPRS  
Des. Roy. Geog. Soc. Gen. Man. Inst. Fr.  
and  
John Arrowsmith  
F.R.G.S.



primitive seat of their forefathers was at Tullo (mount) Wolál, between Sayo and Afillo (the Christian country already mentioned), towards the river Baro. The tradition is universal among them as to their having first come from Bar-gáma, which is understood to mean "beyond the *bahr* or sea." But supposing the Gallas really to have come from the W., the expression Bar-gáma might mean "beyond the Baro."

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V.—*A few Observations on the Ural Mountains, to accompany a New Map of a Southern Portion of that Chain.* By RODERICK IMPEY MURCHISON, Esq., President of the Royal Geographical Society, V.P.R.S., F.G.S., Corr. Mem. Inst. Fr., &c. &c.

THE Ural mountains being less known than other chains to which access is comparatively easy, I venture to call to them the attention of geographers, by briefly alluding to their physical features and mineral wealth, and by the publication of the accompanying map.

When viewed as a whole, the Ural constitutes a long and narrow ridge, which, extending from the Icy Sea on the N. to the parallel of Orenburg on the S., separates Europe from Asia throughout 18° of latitude. The southern half, reaching to 61° N. lat., is alone colonized, and forms the subject of this notice. The northern portion, covered with impenetrable forests and deep morasses, is still left to its wild inhabitants, whether Ostiaks, Voguls, or Samoyedes; its eastern flank having never been explored beyond 65° N. lat. (and that on one occasion only). To that north-eastern tract I will subsequently direct attention, when the labours of its chief explorer, Captain Strajefsky, will be co-ordinated with those undertaken during the last summer on the north-western flank of the chain by my friend and former companion Count Keyserling, who for the first time has truly developed the geography, geology, and natural history of the mouths of the great river Peichora, and has shown the real nature of the ground, including a ridge called the Timan, which trending, for about 500 miles, from the great headlands of the Icy Sea on the W.N.W. towards the Ural on the S.E., constitutes the north-eastern girdle of Europe. From these slightly-known Arctic regions, which will be geologically described in another work,\* let us, in the mean time, turn to the portion of the Ural which is occupied by Russians.

Our illustrious foreign member, Von Humboldt, has taught us † that a considerable portion of the precious metals in use

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among the Greeks and Romans was probably derived from this portion of the Scythian wilds; but modern Europe has been acquainted with them as sources of mineral wealth for a century and a half only. It was in the last year of the 17th century that Peter the Great formed the first mining establishments (*Zavods*) under the direction of his able envoy Demidoff, since which period a steady progress has been made in developing the resources of these mountains; and a large portion of the Siberian flank of the Ural may now be unhesitatingly considered one of the most civilized tracts of the empire, whether as regards the industry and intelligence of the natives or the state of arts and manufactures.

English readers may feel some interest in knowing to what extent this region and the mines of Siberia have proved productive. In the year 1837, the total gold produce of the Ural Mountains exceeded 304 poods, the larger half of which proceeded from private mines. At that period this chain was by far the richest seat of gold ore in the Russian empire; for all the other and more distant mines of Siberia, together, contributed but 130 poods; the total produce of the year 1837 being 444 poods. In 1838, the Ural mines yielding nearly the same as in the previous year, the eastern Siberian mines contributed 226 poods, making a total of 525. In subsequent years, however, the produce of the Ural slightly diminishing (the gold alluvia having been to some extent exhausted), the other auriferous tracts of Siberia, including the distant Altai Mountains and their dependencies, have prodigiously increased in value. In 1842, the total amount had already reached 1000 poods (nearly double that of 1838); and in the last year, 1843, it has swelled to the enormous quantity of 1342 poods!—the great increase having been chiefly derived from the governments of Tomsk and Yeniseik. Now, taking the pood at 43 lbs. 10 oz. 3 dwts. troy,\* and estimating the ounce of gold at 3*l.* 17*s.* 10½*d.*, and the fineness of the gold at the British standard, the sterling value of the last year's produce of Russian gold amounts to 2,751,962*l.* Notwithstanding this vast increase, it is probable that, for many years, the produce may rather continue to augment than diminish; for the flanks of several distant chains in the boundless regions of Siberia, in which conditions favourable to the production of gold ore are known to exist, have as yet been very imperfectly explored.

Let us, however, now refer to the Ural chain alone. In 1837 it yielded, besides the gold, near 120 poods of platinum; and, though an equal or greater quantity might now be procured, the government has almost abandoned the extraction of this metal,

\* The equivalent of the pood in English weight is taken from the last and best authority.—*Travaux de la Commission pour fixer les Mesures et les Poids de l'Empire de Russie*: rédigés par A. Ch. Kupffer. St. Petersburg. 1841.

owing to the cost of reduction, and the repugnance of the people to receive it as a coin of high price. The platinum of the Ural is now chiefly worked by the Demidoff family. With small exceptions, near Ekaterinburg and Miask, where gold veins have been explored in the rock, the gold and platinum of the Ural are found in ancient alluvia, consisting of sand, gravel, and shingle. Enormous quantities of the purest magnetic iron ore are, however, extracted from the solid rock in open quarries; and in some districts, notably in that extending from Nijny Tagilsk to Bogoslofsk, copper veins abound. With one exception, all the gold mines are on the Asiatic or Siberian flank of the Ural, and on the same side are nearly all the rocks of eruptive or igneous origin, and all the great veins. The great mineral wealth of the chain occurs between  $54^{\circ}$  and  $60^{\circ}$  of N. lat.; the southern extremity, which is very picturesque, being comparatively poor, whilst the extreme north or Arctic region, containing few good ores, is yet unreclaimed, and is indeed unfitted for the existence of a civilized race.

Notwithstanding their great wealth and importance, no detailed Russian map of the inhabited parts of this region has yet been published; still less have these mountains been trigonometrically surveyed. A very useful general map has, however, been prepared in Prussia, through the labours of her enlightened geographers, led on by Baron Humboldt. It is appended to the work of his scientific colleague, M. Gustav Rose, who has so ably described the rocks and minerals of the chain. This map was the basis of the observations of myself and friends; and without the assistance we derived from it, we could not have attempted to unravel the true geological structure of these mountains.

Desiring to facilitate the inquiries of our expedition,\* the Imperial Minister of Finance, Count Cancrine, had, through General Tcheffkine, directed the commanding officers at the different Zavods to prepare for my use, copies of such mineralogical and geographical maps as had already been executed. The most useful among these consist of mineral surveys of the mining country around Bogoslofsk, lat.  $60^{\circ}$ , by Captain Karpinsky; of the region near Ekaterinburg; and of the tracts near Zlatoust and Miask, by Major Lissenko. These documents were of use to my friends and self in our attempt to construct a general geological map of the chain, and to bring the metamorphic masses, of which it is in great part composed, into accordance with the unaltered deposits of Russia in Europe. We also found, that since the preparation of Humboldt's map, new materials had accumulated, and that several detailed maps of districts had been

\* Mr. Murchison was accompanied by M. E. de Verneuil, Count A. von Keyserling, and Lieut. Koksharoff.



published in the volumes of the School of Mines. In addition to these, Colonel Helmersen, one of the foremost in extending the geographical knowledge of the chain, has recently produced a small general map of the whole mountain range between the Northern Sea and the Sea of Aral.\* The most important new feature of this map consists in the representation of a flanking eastern range, extending from N. to S., through the steppes of the Kirghiz, parallel to the Ural. Such, with a new M.S. map of the South Ural, hereafter to be mentioned, are the materials which have been consulted.

Upon a general scale, the Ural Mountains, as before said, may be considered a narrow mural mass, trending from N. to S., and separating Europe from Asia. But this view calls for essential modifications. For example, though the northern portion is more or less constituted of a simple central ridge, it is fringed to some extent by low parallel embranchments, which, expanding in the South Ural, there constitute separate mountains to the W. of the chief crest; thus between Verch Uralsk and Sterlitamak the chain has a width of upwards of 100 miles. The true watershed of this chain, or the Ural-tau, has an average height of from 2000 to 2500 feet above the sea. It may be said to be continuous throughout nearly 18 degrees of latitude, being nowhere traversed by deep gorges or transverse streams worthy of the name of a river, though the affluents of the Tchussovays, the Miass, and the Ai, present slight exceptions to this rule.

A central depression in the watershed, not 1400 feet in height, has been rendered available in constructing the great road from Russia to Siberia, by Ekaterinburg; and if the elevations of the Ural were to be judged of by the traveller who had seen them in no other latitude, he could scarcely apply to them the name of mountains. They are, however, rendered much more imposing, both to the N. and S. of Ekaterinburg, by rugged rocky summits, chiefly on the E. side of the crest, which, in N. lat. 60°, near Bogoslovsk, rise from 3000 feet into the Kondshakofskoï-Kamen 5720 feet above the sea; whilst in the Taganai (near Zlatoust) and the Iremel or Eremel of the South Ural the altitudes are, respectively, 3600 and 5071 feet. These heights, and others marked upon the map, are chiefly derived from Colonel Helmersen and Baron Humboldt.

Unlike the Northern,† the Southern Ural is composed of many

\* See Colonel Helmersen's Memoir, 'L'Oural et l'Altai,' Ann. des Mines de Russie, 1838. Since this and other communications were made, the author has published new barometrical and psychrometrical, as well as geological, observations on the chain. *Reise nach dem Ural und der Kirgisen Steppe*. Petersburg, 1843. The latter work contains a good account of the lilly tract, an eastern parallel of the Ural, called Djalyk Kutanaï and Kara Edir-tau. (See Map.)

† The word northern is here used in reference to the accompanying map. In a general map of the whole meridian chain, this tract, extending from Bogoslovsk to the

separate longitudinal ridges, which, diverging from a common nucleus in a fan-shape, trend to the S. and by E. and S.S.W. With the exception of the plateau of the Sakmarka, nearly all this region is picturesque and highly diversified. It embraces the mountains Yurma or Jurma, Taganai, and Iremel; the latter, as already mentioned, attaining an altitude of near 5100 feet above the sea. The whole of the South Ural is included in the government of Orenburg, and is to a great extent a pastoral Baschkir country.

In addition to numerous detailed researches upon either flank of the chain, my own knowledge of its northern portion, laid down upon the map, was obtained by traverses in three parallels: 1st, by the depression, or high-road to Ekaterinburg; 2nd, by recrossing it from Blagodan, a celebrated mount of magnetic iron, and then descending the rivers Serebrianka and Tchussovaya; 3rd, by re-traversing from Ust Koiva by the mines of Chrestovosvidgensk, near Bissersk, over the rugged mountain of magnetic iron called Katchkanar, to the imperial mines of Turinsk and the town of Verkhoturié in Siberia.

This last-mentioned route, known to few travellers, and undescribed by any man of science, may be taken as a type of the primordial lines of communication across the dense forests and deep morasses of this wild region when first colonized. Without the cordial assistance of my friend the late Prince of Butera (married to the proprietress of the gold-mines near Bissersk), no efforts of my companions or myself could have enabled us to force our way through the bogs and thickets which encumber the nearly obliterated path which was once a practicable roadway. To the N. of this track there exists no summer route whatever across the ridge; that which was used in the early periods of the colonization of Siberia, and even some time after the reign of Peter the Great, having nearly relapsed into its state of original wildness.\* This circumstance is easily explained. The government has found it less costly and more convenient to centralize the products of the mines at Ekaterinburg (to which town the roads, proceeding from N. and S. in lateral depressions, are good and easily repaired), and thence to transport the materials by the great central route to the Tchussovaya river, by which, and its recipients the Kama and the Volga, they are conveyed to the heart of Russia, rather than to keep up a long line of land-carriage.

On the eastern flank of the Ural we examined all the mining

S. of Ekaterinburg, would necessarily be called the "Middle Ural," in contradistinction to the Arctic Ural and the Southern Ural—the former terminating in the glacial ocean, the latter along the line of the Sea of Aral, or in the high grounds between it and the Caspian. (See P.S.)

\* M. de Verneuil and Count Keyserling went as far to the N. as Solikamsk, in the hope of reaching Bogoalofsk by that old road, but were compelled to return.

tracts between Bogoslofsk and Ekaterinburg, including the great establishments of the Demidoff family at Nijny Tagilsk, where 22,000 well-ordered and comfortably-housed inhabitants are gathered together under directors, whose skill and science have earned for them the eulogy of Humboldt.\* From Ekaterinburg,† M. de Verneuil and myself descended the Issetz river in canoes (as we had done on the Serebrianka and Tchussovaya), to acquire a detailed acquaintance with the rocks on the Siberian flank of the chain; whilst Count Keyserling re-traversed it to follow, on its western side, the rivers Sylva, Ufa, and Ai. Regaining the ridge, and coasting it by the mines of Kyshtinsk and Soimanofski, I then passed over it obliquely to Zlatäust, the great centre of the southern imperial mines. And here it was that we were witnesses to the very surprising progress in the manufacture of steel which the Russians have made in the last few years, under the direction of that skilful metallurgist and excellent administrator, General Anósoff,‡ whose damasked scimitars, as well as every description of ornamental steel, vie with, if they do not excel, any similar products of our own country.

From Zlatäust, recrossing the Ural-tau to Miask (the centre of the gold-mines on this parallel), I then stretched eastward, accompanied by Lieut. Koksharof, into the low Siberian steppes, as far as the town of Troitsk, a mart of merchandize on the edge of the wilderness of the Khirghis, and at which the products of Bokhara are exchanged for Russian goods. Thence, regaining the eastern foot of the Ural, by crossing a low elevation of granite with metamorphic rocks (since marked upon the maps of Humboldt and Helmersen as a parallel ridge *Djabyh Karagai*), I travelled southwards, along the river Ural, to Örsk; from whence, passing

\* In addition to hospitals and schools, in which even the sciences are taught, M. Anatóle Demidoff has caused a trigonometrical survey of the extensive property of his family to be made by French engineers, who were surveying during the period of my visit.

† Besides its mining works, conducted by the imperial government and by the rich individual M. Jacoff, Ekaterinburg is noted, in common with other places in Siberia—such as Kolyvan—for the polishing of precious stones by water-power, including the porphyries, agates, jasper, and malachites, of the adjacent mountains.

‡ I would here refer the reader to a very elaborate criticism of Captain James Abbott (who travelled from India, by Khivah, to Russia) on the damasked swords of the East, and on those of Zlatäust in particular, in which he uses expressions which I am delighted to repeat:—"The general fault of European blades is, that being forged of sheet-steel for the sake of elasticity, they are scarcely susceptible of the keen edge which cast-steel will assume. The genius of Anósoff has triumphed over this objection, not in hardening the soft steel, but in giving elasticity to the hard; and it may be doubted whether any fabric in the world can compete with that of Zlatäust in the production of weapons combining, in an equal degree, edge and elasticity."—Narrative of a Journey from Herat to Khivah, Moscow, and Petersburg, vol. ii., Appendix, p. lxxxvii. An elaborately wrought and beautiful plateau, presented to me by the Imperial Administration of Mines, as well as a sword and dagger given to me by my kind friend General Anósoff, and all made under his direction at Zlatäust, have excited the admiration of my scientific countrymen.



the southern end of the chain where it subsides into the lower Guberlinski hills, I reached Orenburg. I was there joined by my companions, who had traversed the tracts around Krasnoe-Ufinsk and Ufa.

Having made an excursion in the southern steppes to the famous mines of rock-salt at Illetzkaya Zastehita, we again re-entered the South Ural to visit General Perowski, then governor-general of Orenburg, at his *hatchuska*, or summer retreat, situated amid groves of ilex. On that occasion he presented to me an original map, reduced from elaborate field-surveys executed under his orders by the Russian staff-officers. The sight of this beautiful map, which I have since given to the Geographical Society, made such an impression upon me, that I at once resolved, notwithstanding the short time at my disposal, to cross and recross the South Ural of the Russians by the only practicable routes. Whilst M. de Verneuil and myself, kindly protected by the distinguished general, and escorted by Baschkirs, were threading these picturesque mountains, our colleague, Count Keyserling, visiting Mount Bogdo, made himself acquainted with the steppe of the Kirghis, which lies between the Ural and the Volga. The route of myself and friend was by Preobrajensk, over the sharp ridge called the Irendyk (the southern prolongation of the Ural crest) to Verch Uralsk; from whence we finally turned W., and passed over the whole of the ridges and depressions of the chain, which are so expanded between that town and Sterlitamak on the Bialaya (see map).

In respect to this last-mentioned country, the map now published, which Mr. Arrowsmith has rendered a faithful reduction of that of General Perowski, and other Russian documents, will, I trust, be found a manifest improvement on the published documents which have preceded it.\* The original can always be consulted in our library. The tracts which are laid down upon it (inhabited for the most part by Baschkirs, in their Asiatic costume) are more attractive than any part of the Russian empire which I have visited, and infinitely superior to the regions either around Ekaterinburg or to the north of that city. The forms of vegetation of the north and south are commingled, and the noble *Pinus cembra*—the type of the whole chain—which in the North Ural is accompanied by firs and birch only, is here surrounded by numerous forest-trees, and plants of warmer latitudes. The land, in many broad valleys or straths, is of the richest quality; and whether in the depressions of the Bialaya or its tributaries, or to the S. of Miask, near the sources of the Ural, I met with bands

\* A Russian map of this territory and the adjacent lands, the country named by M. Khanikoff in his memoir 'the Western Advanced Range,' is in preparation by that author, to whose kindness I am much indebted for various corrections of the map now published, which is, perhaps, most defective in the S. Western part of the government of Orenburg.

of deep black mould (*tchornozem*), yielding the most splendid natural crops, and rank with various grasses.

A very brief outline of the geological observations made in these travels has been laid before the Geological Society, and more complete materials will be shortly presented to the public in a separate work upon the whole structure of Russia, in which an attempt will be made to explain the causes of the peculiar mineral condition of the Ural, accompanied by the first general geological map of the chain which has been prepared. As, therefore, geographical readers who seek for such information know where to find it, I dismiss this subject by simply saying, that in approaching the Ural from any point upon its western flank, the traveller proceeds from an undulating low region of red ground (included between the river Volga and edge of the mountains), which is entirely composed of the youngest rocks of the palæozoic æra—rocks feebly represented in England by the magnesian limestone and its associated red sandstone. Occupying a region more than twice as large as the kingdom of France, and extending from the Northern Sea to the Southern Steppes, over 18° of latitude, this red deposit of sand and marl, with limestone, gypsum, and sulphur, contains also, at intervals, a prodigious amount of copper, which does not occur in veins, as is usual, but is distributed in grains through the strata. It is to this vast cupriferous deposit I have applied the name of "Permian system;" seeing that in the ancient kingdom of Permia it exhibits a much finer development than the natural group of the same age in Western Europe, which has never yet had a collective name.

Rising from beneath this cover of Permian deposits, the European flanks of the Ural are composed, in descending order, of carboniferous, old red or Devonian, and Silurian rocks, all occasionally replete with fossils. Though many iron-mines (brown iron ore) exist, one gold-mine only is known on the western flank of the chain, and this, near Bissersk (where a few diamonds have also been found), is in the neighbourhood of an isolated mass of eruptive rocks. The crest of the chain, or watershed, is essentially composed of chloritic and quartzose rocks, altered palæozoic formations, which are immediately succeeded on the E. by numerous outbursts of rocks of igneous origin, amidst which, and in the metamorphic strata, which are in contact with them, occur all the most valuable mines of gold, platinum, copper, and magnetic iron, before alluded to. It is thus seen, that the productive mineral veins in these regions occur as constants, wherever the pre-existing strata have been much penetrated by igneous eruptions. On the Asiatic side of the chain there is no longer a trace of the horizontal red Permian deposits so rife on the western flank. Low hills of younger granite and other eruptive rocks, with palæozoic and metamorphic deposits, are there alone covered towards their

eastern edges, by tertiary accumulations and local detritus, in which the bones of extinct mammals (mammoth and rhinoceros) are mixed up with the gold sand and shingle of the mines.

But whatever success might attend the general geological survey, I felt convinced that little justice could be done by myself to the beautiful map of General Perowski. I therefore prevailed upon M. J. Khanikoff, a zealous geographer attached to the staff of the General, and who had studied the South Ural at his leisure, to furnish me with a description of it. His memoir would have been sooner communicated to the Society had it not been written in the Russian language. To render into English the precise meaning of many expressive Russian words has been no easy task for the accomplished translator\*; and even now it is doubtful to what extent he may have succeeded. The subjoined explanation of our editor will, however, develop the meaning of the author. In alluding to this memoir, I am, however, bound to state, that it not only specially illustrates the map of General Perowski and the South Ural of the Russians, but is an elaborate description of the physical features of a vast surrounding region, the improved Russian maps of which (extending even to the Aral and the Caspian) must be consulted, in order to make it fully intelligible.

In conclusion, I have only to express my hope that, however my own efforts may be received, geographers will look upon the accompanying map and the following memoir as evidences of the generous and noble conduct of his Imperial Majesty, who directed his representatives to furnish the English traveller with every document that could facilitate scientific research; thus proving that it is a principle of his government vigorously and munificently to encourage the advance of natural knowledge.

P.S.—In reference to some concluding observations in the memoir of M. J. Khanikoff, I would observe that his brother, M. N. Khanikoff, who has explored the regions between the Aral and Bokhara, recently communicated to me, at St. Petersburg, some precise knowledge respecting the low mountains which, ranging from Mount Airuk towards the Aral, constitute one (perhaps the chief) of the southern prolongations of the Ural chain. From Captain Romanoff, who surveyed the northern edges of the Aral, I have also learnt that its shores there consist of marlstone cliffs, which subside eastwards into the low sandy deserts of the Sir, or Jaxartes. The same officer assured me that the large island in the northern part of the Aral Sea, which has so long found a place upon our maps, has no existence, its insertion having probably been caused by the figurative language of the Kirghis inhabitants, who speak of it as “an isle from whence

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\* Count Krasinski.



no traveller returns." I have further learned, from Colonel Helmersen, that M. Basiner discovered a mountainous ridge of greenstone, trending from N. to S., called Shik-Djeli, at the southern end of the Aral Sea, and on the right bank of the Oxus, N. of Khivah. These data, with a general correction of the outlines of the Caspian and Aral Seas, will shortly appear in the geological map of Russia.—(October, 1844.)

VI:—*Orographical Survey of the Country of Orenburg: from the Russian MSS. of M. J. Khanikoff. (Communicated by the President.)*

[Mr. MURCHISON has explained towards the close of the preceding paper what gave occasion to the composition of M. Khanikoff's memoir, and how it came to assume its present form. The disadvantages under which it will be seen from Mr. Murchison's statement, the memoir appears, will have prepared the reader to encounter a few passages in which the author's meaning may not appear so distinctly as could be wished. Some difficulties, which otherwise might arise from his peculiar technical phraseology, may be obviated by a few remarks upon that phraseology, and on his method of arrangement.]

M. Khanikoff, like Mr. Murchison, applies the name Ural to the whole of the elevation, or bulging of the earth's surface, which extends in its longitudinal direction from the Icy Sea to Lake Aral. The portion of this mountain mass described in M. Khanikoff's Memoir, under the designation 'Country of Orenburg,' is that which extends from a line drawn E. and W. from the sources of the Miass southward to the Aral.

This portion M. Khanikoff views as composed of a central-mountain region and three advanced ranges; and upon this conception his first great division of the subject rests. He passes in review separately:—the central-mountain system; each of the three advanced ranges; and, in order to render his description more complete, the depressed plains or valleys which adjoin their bases.

The description of the central-mountain system is further subdivided. M. Khanikoff finding that the predominating form in the northern region is the Alpine, or combination of ridges; in the southern the plateau: describes each apart.

In his description of the Alpine or northern region he first follows the summit level or watershed of the region from its northern boundary to where it widens out into the plateau-formation; second, describes the western; and, third, the eastern declivity of the range. The method of description pursued under each of these three heads is nearly the same. M. Khanikoff designates the eminences which rise above the average level of the Ural mass "ridges," when their length is markedly greater than their breadth; "mountains" or "peaks" when these two dimensions are nearly equal. The higher elevations of each "ridge" he also calls "peaks." The "mountains" or "peaks" he distinguishes into five classes, according to their size and predominating forms. To these he adds a sixth, the *syrt*—a term used by M. Khanikoff in a

rather vague and fluctuating sense; appearing sometimes to indicate a "mountain," sometimes a peculiar form of "ridge." Under each subdivision M. Khanikoff enumerates, and briefly describes every "ridge" and "peak" that occurs in it; and then the valleys or river-courses which divide or intersect them. In his description of the western declivity he has for greater convenience introduced a further subdivision into four districts designated from their relative position to each other as "eastern," "western," &c.

The southern, or plateau division, of the central-mountain system is described under six subdivisions:—first, the surface of the summit level of the plateau; second, the northern declivity or terrace-slope of the plateau; third, the N.E. terrace; fourth, the S.E. terrace; fifth, the S. terrace; sixth, the W. terrace. Owing to the greater variety of local forms which occur on the western terrace, M. Khanikoff has found it convenient (as in his description of the western declivity of the Alpine region, to adopt an additional arbitrary subdivision into "central," "south-eastern," and "extreme western" parts. The method of description pursued in each of these divisions and subdivisions, is the same adopted in describing the Alpine region.

The remaining principal divisions of M. Khanikoff's Memoir are:—The western advanced range; the western depressed valley; the north-western advanced range; the south-eastern advanced range; the north-eastern depressed valley; and the southern depressed valley. The method of description adopted in each of these divisions is determined by the preponderance of the Alpine or of the plateau formation, as the case may be, in each; and is identical with that pursued in the two principal subdivisions of the central-mountain system.

The central-mountain system of M. Khanikoff is the Ural N. of the part of the course of the river of that name in which it flows from E. to W.: his western advanced range is what is commonly called the Obtebei Syrt; his western depressed valley is the valley of the Bielaya; his north-western advanced range is a group of "ridges" or "peaks," to the N. of the Bielaya; his south-eastern advanced range is the mountain mass between the river Ural and the Aral; his north-eastern depressed valley embraces the upper valleys of the Tobol, Ai, and Miass; and his southern depressed valley embraces the low lands between the Obtebei Syrt and the Caspian.

M. Khanikoff's mode of conceiving the structure of the mountain mass he describes differs widely from that which prevails among English geographers. We are far from affirming that M. Khanikoff's offers sufficient advantages to render its general adoption desirable; but it was deemed unadvisable to hazard any addition to the obscurities which may have arisen from the difficulty of adequately expressing the exact import of Russian terms and phrases in English by translating (if so bold an expression may be allowed) his mode of conceiving geographical forms and relations and his technical language into those which prevail in England.

Having, in preparing his Memoir for the press, compared minutely that part of it which relates to the central-mountain system with Mr. Murchison's map, we are satisfied of its general accuracy. For the

western advanced range Humboldt's map, appended to Rose's work, may be consulted with advantage; for the southern depressed valley, the map which accompanies Gübel's *Steppen Reise*, is as yet the best guide; for the rest, Lieutenant Zimmermann's map of the regions around the Aral, or, better still, Mr. Arrowsmith's edition of it may be consulted.

With these aids, and by keeping in mind M. Khanikoff's leading technical terms and the classifications he has based upon them, the English reader will find no insuperable difficulty in following out the thread of the Memoir; although, without their assistance, the minuteness and multiplicity of M. Khanikoff's details might be found embarrassing. The principal technical terms to be kept in mind are:—Alpine system; plateau; depressed valley; ridge; mountain, or peak; syrt. The subjoined scheme of the leading divisions may be useful for reference, and for impressing them on the memory.

I. The central-mountain system, pp. 281-313.

1. The northern, or Alpine division, pp. 281-298.

A. The watershed, pp. 281-283.

B. The western declivity, pp. 283-298.

a. The eastern part, pp. 284-292.

b. The western part, pp. 292-295.

c. The north-western part, pp. 295-297.

d. The southern part, pp. 297-298.

C. The eastern declivity, pp. 298-302.

2. The southern, or plateau division, pp. 302-313.

a. Surface of the plateau, pp. 304-305.

b. Northern terrace, p. 305.

c. North-eastern terrace, pp. 305-307.

d. South-eastern terrace, pp. 307-308.

e. Southern terrace, p. 308.

f. Western terrace, pp. 308-313.

II. The western advanced range, pp. 313-317.

III. The western depressed valley, p. 317.

IV. The north-western advanced range, pp. 317-318.

V. The south-eastern advanced range, pp. 318-320.

VI. The north-eastern depressed valley, p. 321.

VII. The southern depressed valley, pp. 321-324.—Ed. G. J.]

UNDER the term "country of Orenburg" is here comprehended not merely the government of that name, but the whole of the Ural mountain-range S. of the rivers Kama and Miass, with the adjoining region as far S. as the Caspian. The region thus designated is bounded—on the S. by the Ust Urt, and the northern shores of the Caspian and Aral; on the E. by the Mündjarski Mountains and the upper valley of the Tobol; on the N. by a line drawn E. and W. from the elbow of the Miass to the



valley of the Kama; on the W. by the Kama and the valley of the Lower Volga. Three of the principal geographical forms are found developed in this region, though not on so colossal a scale as in some other parts of the world; viz. the mountain-range, the plateau, and the depressed valley. The central part is occupied to the N. by a system of mountain-chains; advanced ranges, assuming the form of elevated plateaux, attach themselves to it on the W., N.W., and S.; and these subside on the W.; on the N.E. and on the S. into depressed valleys or plains.

### I. THE CENTRAL MOUNTAIN SYSTEM.

The central mountainous region is bounded by the rivers Ufa and Bielaya, the valley of the Ik, the river Ural, and the upper valley of the Miass. Its form is nearly that of a parallelogram, 500 versts in length, and from 150 to 200 versts in breadth. In some parts of this region the pure mountain form predominates; in others it presents the appearance of a transition from the mountain to the plateau. This diversity suggests a natural division of the region into two parts:—1. the central, of a well-defined alpine character; 2. the southern, presenting a number of slopes, terraces, or inclined planes.

#### 1. NORTHERN OR ALPINE DIVISION.

A. THE WATERSHED.—The well-defined mountain region is the southern termination of the principal watershed, which separates the river-systems of Asia and Europe, known by the names of Ural, the Riphean mountains, and the Rocky Belt. It has its western base in the valley of the Bielaya and the lower valley of the Ufa, and its eastern base in the upper valleys of the Miass and Ural. This central watershed, which has an almost imperceptible ascent N. of the sources of the Ufa, rises to a considerable altitude in the southern part, which extends into the government of Orenburg.

Commencing at the sources of the Ufa, and tracing the summit-level of the watershed southwards; its direction is as follows:—To the upper part of the river Kialim (30 versts) from N.N.E. to S.S.W.; thence for the next 10 versts S.W.; thence to the sources of the Ural (70 versts) S.S.W.; between the upper valleys of the Ural and Bielaya (30 versts) W.S.W.; thence to the upper course of the rivulet Ukshuk (70 versts) S.S.W., with a slight curve convex to the E.; thence to the sources of the Tana (140 versts) in a straight line S.S.W. The whole of this central range presents the appearance of a uniform broad-backed ridge, surmounted by peaks more or less elevated.

The most prominent peaks are cones rounded at the summits, and consist of layers of broken stones, from which considerable masses of quartz shoot up, of which the solid interior seems to be composed. The sides of these peaks present frequently the appearance of a succession of terraces. The inferior peaks have the appearance of mounds of stony fragments. Scattered heaps of small stones extend sometimes for considerable distances round the larger peaks into the bogs which surround their bases.

The ridge of the watershed is almost everywhere covered with forest, in which the birch predominates. The declivities are gentle, covered with trees, and seldom interrupted by crags. The branches which diverge from the main ridge retain its general character. The hollows between them have steep sides, with bogs at the bottom.

The greater number of lateral chains diverge from the western side of the Ural towards the valley of the Ai (an affluent of the Ufa, and the upper valley of the Bielaya. The most remarkable of these are the chains—between the rivers Tesma and Tchernaya; on the left bank of the river Vesselaia; on the right bank of the river Syrghy-Urutchkan; on the right bank of the river Kitchkina; on the left bank of the river Nata; and on the right bank of the river Kushuk. The principal lateral chains in the valley of the Miass spread out into minor branches, which deserve a special description. The lateral chains are numerous in the upper valley of the Ural, separating the valleys of the affluents which join it from the right bank. They are steep and bare, but for the most part of inconsiderable height. Few lateral chains diverge from the central range towards its southern extremity, which has a gentle slope, a flatter summit than further north, and few considerable peaks.

The most remarkable peaks along the central watershed which has just been described are:—

Mount Jurma, or Yurma, at the sources of the rivers Ufa and Kussa. This mountain consists of a range of heights from 8 to 10 versts in length, which increase in height towards the N. The highest summit consists of three super-imposed terraces. The terrace which forms its base has a gentle slope, and is entirely covered with trees. The middle terrace is more abrupt, has its surface covered with rocky fragments, and produces some straggling firs and brushwood lower down, but on its upper part is covered with moss. Enormous rocks of quartz shoot up from the flat summit of this second terrace, forming the third, which, seen from a distance, has the appearance of a picturesque ruin.

Taghanaï, at the sources of the river Tesma, consists of two distinct mountains, the great and the little Taghanaï, separated by a deep cleft or chasm, covered with rocky fragments. The great Taghanaï has three pinnacles, arranged in a line from N.E. to S.W. The middle pinnacle is the highest; its summit, like that of the Yurma, is composed of quartz rocks. Its base has a gentle slope and is little encumbered with *débris*. The little Taghanaï has only one pinnacle.

The Alexander's Peak, formerly called Ural-tau, is of a rounded form. It received its present name in consequence of its having been ascended by the Grand duke Alexander, the hereditary prince of Russia.

Ui-tash rises between the sources of the rivers Ui and Ural.

Riäss-tash, near the source of the river Riäss, consists of a group of large rocks.

The altitude of the central range has only been determined by barometrical observations, and at few points. The results are as follow:—

Mountain Peaks:—

	Parisian Feet.
Yurma (Helmersen)	2750
Taghanaï, middle peak (Kupffer)	3370
Taghanaï, W. peak (Kupffer)	3036

Crest of the ridge:—

Base of the middle peak of Taghanaï (Kupffer)	2889
Summit level between Zlatiust and Minskoï (Kupffer)	1825
————— between the foundries of Bielorietzkoï and the town of Verch Uralak (Kupffer)	2370

Valleys and ravines:—

Below Taghanaï (Kupffer)	2174
Zlatiust (Kupffer)	1120
Source of the river Bielaya (Helmersen)	1901
Source of the Ural (Helmersen)	2026
Foundries of Bielorietzkoï (Helmersen)	1543
Source of the river Sakmara (Helmersen)	2349
Source of the river Kana (Helmersen)	2061

It appears from these results that the greatest absolute elevation of the watershed does not exceed from 2000 to 2500 Parisian feet, and that its mean altitude is between 1500 and 2000 Parisian feet.

B. THE WESTERN DECLIVITY.—The descent from the summit level of the central Ural to the west, generally taken, may be called an inclined plane varying from 120 to 200 versts in breadth. As we possess only the measurements of the heights along the upper edge of this declivity given above, its angle of inclination cannot be ascertained with precision. Barometrical observations were, it is true,



made along its lower edge by order of the Governor-General of Orenburg in 1838; but the calculations of the data thus obtained are yet unfinished. Judging, however, by the difference of the climate at the base of the slope and at the summit-level, and also by the rapid course of the rivers which furrow the declivity, the angle of inclination must be considerable. In passing the western declivity in review it will be of advantage to direct attention to four different portions of it in succession, which may be designated the eastern, the western, the north-western, and the southern.

a. The most easterly part of the western declivity of the central Ural is bounded on the west by the ridges Narali, Tchil-kovoï, Sullia, Suka, Zighalga, Kariazi, Nary, Kataskin, Alatau, Masim, Bakkal, and is of an irregular figure. The eastern side, which extends almost in a straight line from N.E. to S.W., is 300 versts in length; its N. side measures 30 versts along the summit-level, and its S. side 80 versts along the lower termination of the declivity. In the extreme north the direction of the declivity is to the south, towards the river Ai. From the ridges Avaliak, Iremel, Bakty, Miriak, Yaman-tash, Mashak, Nary, and Kariazy the ground slopes northward to the river Ai. Between the last-mentioned mountains, the central ridge, and the ridges Yúsha, Yurma-tau, Zilmerdak, Alla-tau, and Bakkal, the direction of the declivity is again to the south. The remainder of this part of the western declivity slopes to the N.N.W.

These slopes are furrowed or channelled by the valleys of the river Kussa, flowing to the S.S.W.; the Arsha, to the S.S.W.; the Ai, to the N.N.E.; the Kamenka, to the N.; the Satka, in its upper course to the N.N.W., lower down to the N.; the Yúezen, to the N.N.E.; the Katav, to the N.N.W.; the Bielaya, to the S.S.W.; the great Inzer, in its upper course to the S.S.W., lower down to the N.N.W.; the little Inzer, in its upper course to the S.S.W., lower down to the N.N.W.; the Avzian, to the S.; the Uriuk, to the S.S.W.

All these valleys intersect the parallel ridges which constitute the central mountain region of the Ural. Five principal and a number of subordinate parallel ridges extend along the division of the western slope now under consideration.

The first of these (the most westerly), begins on the left bank of the Inzer, between the rivulets Brish and Denyak. This ridge is called Zilmerdak, and extends under that name 50 versts in the direction of S.S.W., between the upper basins of the affluents which join the Inzer from its left bank, and those which join the Zilim from its right bank. At the upper Zilim the Zilmerdak ramifies into five lesser ridges, through

which the river breaks in its course westward. The continuation of only three of these minor ridges can be distinguished on the left bank of the Zilim—the Ala-tau, the Kalu, and the Biash-tym, which extend to the upper basin of the Uriuk, a distance of 60 versts from the sources of the Zilim.

The second principal ridge, alluded to above, begins on the left bank of the lower Satka, and is at its N.E. termination called the ridge of Tchulkovoï. It runs to the S.W., between the upper basins of the rivulets Kútorka and Sillia, and is there known by the name of the mountains of Súlkia. It extends under different names to the banks of the Yúrezan, which breaks through it. The continuation of the ridge fills up the space between the Yúrezan and the Katav, between the rivulets Kutkur and Aksar. Its prolongation from the left bank of the Katav is called the Karazi ridge. Under this name it stretches along the right bank of the Tilmeï in a S.W. direction to where that stream receives the waters of the rivulet Bieghulú. Between the Tilmeï and the lower Reuat the range is known by the name of Béliagush; between the two Inzers by the name of Saltyz; and S. of the great Inzer, as far as the junction of the rivulet Zigada with the Zilim, by the name of Kalta. The entire length of this ridge is upwards of 200 versts; its N.E. extremity is 30 versts distant from the Zilmerdak; its S.W. termination is only separated from that ridge by the narrow valley of the river Zilim.

The third ridge also commences on the left bank of the Satka, where it is known as the Sukka ridge. It extends in a S.S.W. direction to the Yúrezan, which breaks through it; on the opposite side of that river it receives the name of the Zighalga ridge, and has a S.W. direction as far as the upper valley of the Katav; from the left bank of that stream, retaining the S.W. direction, it extends along the course of the little Inzer to the mouth of the Kareazi under the name of the ridge of Nary; thence to the mouth of the Reuat under the name of Yaman-tau; from the point where it is crossed by the little Inzer, as far as the great Inzer, the ridge is called Kataskyn; and from the left bank of the great Inzer, southwards, between the upper valleys of the Nugush and Bielaya, it is called the ridge of Yurma. Near its termination in the basin of the Kurgas, the ridge bifurcates into two branches, the Massim and the Bakkal. It is in all 260 versts in length. In the north it is 40 versts distant from the preceding ridge, from which, near the little Inzer, it is only divided by the basin of the Reuat. Further S. the distance again increases to 20 versts.

The fourth ridge begins to the north of the upper valley of

the Katav, where it is called Mashak. It extends in a S.S.W. direction between the sources of the Yúrezan and the little Inzer; at the upper course of the great Inzer the mountain-knot of Yaman-tau forms part of the chain. Southward of Yaman-tau, between the two Inzers, the range here called Yusha is broad and rocky, with a S.S.W. direction. From the base of the peak Diunansiyugan which rises here diverge the branches Kapkaly, Irak-tash, and Niara. South of the intersection of this range by the great Inzer, it occupies the space between the Avzian and the Bielaya, and is known by the names of Bashatak and Mentengush. The whole extent of the range is 130 versts; its mean distance from the preceding is 10 versts; its greatest distance 20 versts.

The mountain Yuriek-tau, between the great and little Satkas, is the northern extremity of the fifth principal ridge. From hence to the Inzer it is composed of a single ridge, and has a S.S.W. direction the whole distance. It is called Matkal between lake Ziritkul and the sources of the Beriuzak: Nurgush along the left bank of the Beriuzak from its source to its mouth, Biakty along the right bank of the Yúrezan, Meyerdiak in the upper valley of that river, Tishiktash and Uarkhek at the sources of the Inzer. South of the sources of the Inzer the ridge bifurcates. One branch runs S.S.E. and terminates in the mountains Kirel, or Mashnuri, and Yandyk, near the Bielaya; the other extends between the Suriniak and the Inzer parallel to the fourth ridge. The elevation of this second branch is inconsiderable. The whole of the fifth ridge is 170 versts in length. It touches the fourth at the sources of the rivulet Beriuzak and at the upper valley of the Inzer, and is nowhere more than 15 versts distant from it.

A continuation of the fifth ridge, separated from it by the broad valley of the Bielaya, may be considered as a sixth. It consists of a chain of heights intersected by the affluents of the Bielaya. These heights may be traced in a W. direction for 60 versts along the left bank of the Bielaya under the name of the mountains of Kraka.

A ridge which has no general name, composed of a great many larger and smaller branches, occupies the space inclosed by the rivers Arsha and great Satka, the central Ural and the Urianga. The principal ridge has a S.W. direction from the Arsha as far as the Ustrala; it there turns to the S.S.W., is intersected by the Al, and extends S. of that river in the same direction to the upper basin of the Satka. The more important heights of this ridge are denominated the mountains of Turo-tash, Maskarali, Makal, Uary, Bash-ukty (the bare promontory), Kazak-salgan, and the Zuijeinoia (of serpents).



A separate ridge, which curves to the S.E. from Taghanai to the mouth of the Kussa, may be viewed as a part of this one. It has no general name. To the north it is called Dolgoi-mys (the long promontory), and to the south Lipova-gora (Birchen mount). Another ridge, which has the mountain Urianga at the bend of the river Ai to the W. for its northern termination, may also be included in this system. Its direction is to the S.S.W. From the Ai to the sources of its affluent the Raka, this range is called Urianga, or Urenga; thence to the rivulet Túlúk, Yalaudi; along the right bank of the Túlúk, the Túlúk mountains; thence to the upper Tyghyn, the ridge Awaliak. The mountain-peak Iremel rises where the portions of the ridge named Túlúk and Avaliak meet. The whole of this congeries of ridges is 70 versts in length. At its northern extremity it is 40 versts distant from the second parallel ridge; near the sources of the Túlúk it comes close up to the fifth ridge, but again diverges to the distance of 20 versts from it.

It has already been remarked that all these ridges are crossed and interrupted by the valleys of the rivers which have their sources in them. The general direction of the ridges is from N.E. and N. to S.W. and S. The courses of the rivers have a more direct westerly tendency, from which it would appear that they follow the direction of the great western slope of the whole system, not of the parallel ridges which furrow its surface. The spaces which intervene between the principal parallel ridges are occupied by their branches and spurs, or by isolated heights of inferior elevation and many various directions.

All the heights of all the central mountainous region of the Ural within the country of Orenburg may be referred to one or other of five classes. The first will comprehend the largest mountains of the Ural. Their shape is the same as that of the peaks along the summit-level already described. The mounds of *débris* are, perhaps, larger, the terraces at their bases more steep and on a larger scale than those of the peaks along the summit-level, but there is no difference in any other respect. The second class of mountain forms have more the appearance of shorter ridges, with small peaks of stones or rocky crests rising above their summit ridges. The heights of the third class are less elevated than those of the two preceding classes. They are, for the most part, covered with wood, except on a small plain, in which they terminate: they are less boggy, less precipitous, and rarely present rocky precipices on their sides. The fourth and fifth classes are the branches and terminal terraces of mountains of the three classes already described.

The heights of the fourth class are rocky, precipitous, and of considerable elevation; those of the fifth are lower, have gentle slopes, and are covered with wood.

In the principal ridges the peaks are connected by lower elevations, which are in general full of moisture, and the sources of rivers and rivulets. The character of each of these depends upon the forms of the mountains which it connects. The elevations which connect peaks of the first class are generally, except where the rocky terraces approach the rivers, pretty broad and open; but they are frequently marshy and encumbered with stones. The fluvial basins between peaks of the second and third class are generally narrower, and were overgrown with trees. Where they lie between terraces of the fourth class they form defiles, but this character is of rare occurrence. For the most part, one bank of the river is covered close to the banks with masses of detached rocks, whilst on the other side extend the gentle slopes of the fifth class of heights. The elevations which connect peaks of the third class are broad and sloping when they are not sharpened by heights of the fourth and fifth class rising within them.

To apply this classification of peaks and connecting elevations to the eastern division of the western declivity of the Ural, mountains of the first class are only found in the third, fourth, and fifth ridges, and in the ridge which is the continuation of the fifth on the right of the Bielaya. The most remarkable of them are:—

Iremel or Eremel. The horizontal space on which this mountain rests is in the form of a triangle with its base fronting to the north, along the south bank of the Túlúk, and its apex, pointing to the south, near the upper valley of the Tyghyn. The highest peak overhangs the Tyghyn. Four streams flank the base of the Iremel on the E. and W.; two of these are affluents of the Túlúk and flow to the N., two flow to the S., the Ivaniak and its affluent the Tyghyn. The lowest terrace of the Iremel fronting the Túlúk is steep, craggy, and surmounted by three peaks. The lowest terrace on the side fronting the Yarghista (affluent of the Túlúk) and the little Ivaniak is less abrupt, and offers the greatest facilities to those who wish to ascend the Iremel. A branch called Suk-tash and Yakhak-sia-tash extends between the sources of the Yarghista and little Ivaniak, and connects the Iremel with the ridge Bakta or Bakty. This branch is surmounted by a few precipitous peaks, and the road which winds round the Iremel from the S. passes over it. On the upper course of the Tyghyn the rocky terrace of the Iremel forms with the extremity of the Avaniak a boggy and stony defile, which serves as an entrance to the

high marshy valley from which the Tyghyn flows. Along the N. side of the marsh runs an inconsiderable ridge, which connects the Iremel with the Avaliak. The middle terrace of the Iremel is not very steep; but it is marshy and obstructed with scattered heaps of stones. It rises above the forest region, and is only covered here and there with scanty brushwood. On the narrow plain which surmounts this terrace are a few small lakes; moss and some straggling stunted firs are the only vegetation. The summit is composed of huge quartzose crags, on the level surfaces of which are found mosses and the forget-me-not (*myasotis*; in Russian, *Niezabudka*). Fragments of stone are scattered about the ravines between the crags.

**Yaman-tau.** This mountain is in the fourth ridge. It is near the upper valley of the great Inzer and consists, properly speaking, of two hills, separated by a high marshy valley. The height to the N.W. is the largest. It is situated between the rivulets Kus and Kazaulu; the circumference of its base is of an elliptical form; and joins the ridge Kapkaly on the S.E. The highest peak is to the S.E.; it is steep and surrounded by deep marshy ground in which the Tolpak and the great Inzer have their sources. The lowest terrace of the Yaman-tau has to the N.W. a gentle declivity overgrown with frondose trees. It is overhung by a precipitous crest of crags. To the S.E. of this mural rock, separated from it by a marshy hollow, is situated the principal peak of the Yaman-tau, the largest mass of rocks in the southern Ural. This mound has five terraces. The two lowest are covered with scanty grass and forget-me-nots; on the other three nothing grows but humid moss. There are small lakes or pools on the plains in which the four lower terraces terminate; the surface of the narrow plain on the summit is pierced by quartz rocks. The environs of the Yaman-tau are desolate, a mixture of woods and morasses, the wildest region of the southern Ural.

**Mashak.** This is more properly a ridge than a mountain. On the N. it is divided only by the marshy hollow in which the Inzer rises from the Yaman-tau. Between the sources of the great and little Inzer it has the appearance of a broad ridge, composed of diverging branches. Southward of these sources it has more the appearance of a narrow ridge. It is surmounted by several peaks, the most conspicuous of which are near the sources of the two Inzers, and in their general character resemble the Yaman-tau, though on a smaller scale. The declivity at the base of the Mashak is steep on the S.E., but gentle and wooded on the N.W.

**Yusha**, in the same ridge as Mashak, rises up from the left bank of the Tolpak, immediately S. of the Yaman-tau. Its



middle terrace has the form of the second class: it has only one peak, Diunansiyagan.

Zighalga, situated in the third ridge, between the Lemd or the Yuriasen, or Yúrezan, where it turns to the W., and the upper valley of the Katav, is not so wild and precipitous as the Mashak, but has no less than eighteen considerable peaks. To the N.E. it has a gentle declivity; to the S.W. it is more abrupt.

To the second class belong the mountains Nazimski, Urenga, Yaläudy, Avaliak, Túlúk, Yúriak-tau, Mutkal, Nurgush, Suka, Karazi, Naria, the little Yaman-tau, Saltyz, Kataskin, Bashatak, Kirel-tau, Uarkhek, Mirdiak, and Bakty.

To the third class belong Dolgoi-Mys, Lipo-vaga, Kaskarali, Kazak Salgan, Tchúlkovoï, Suleya, Zilmerdak, Yurnatau, Kalty, Kalu, Beshtym, Ala-tau, Massim, Bakal, Mentengush, Nadash, and Yandyk.

The fifth class comprehends the spurs and branches of the principal heights above enumerated. They occur most frequently about the rivers Kuvash, Ai, and great Satka, between the second range and the prolongation of the fifth, S. of the Bielaya; about the rivers Bielaya, Tirlan, Nura, and Kajygash; in the valley of the river Inzer, between the ridges Mentengush, Kataskyn, and Yusha; in the valleys of the rivers Katav and Yúrezan, between the ridges Suleya, Suka, Zighalga, and Karazi.

The terraces of the fourth class predominate on the right bank of the great Inzer, from its source to the mouth of the stream Kuzel, between the mouths of the Kayate and Inzer; on the left bank of the great Inzer, between the mouths of the rivers Kulashta and Meneir, between the rivers Kosh-elga and Reuat, and in one place near the mouth of the Inzer itself; on the left bank of the little Inzer, near the mouth of the Nar, and between the mouths of the rivers Alghir and Kalma Elga; on the right bank of the Bielaya to the north of the mouth of the Kutkur, and between the mouths of the Kaltaguz and Kurgas; on the left bank of the Bielaya, between the mouths of the rivers Uzian and Kana; in the upper valleys of the Nugash and Uriúk; in the middle part of the valley of the Tirlan; on the left bank of the Yúrezan, at its bend to the W.; on the right bank of the great Satka, between the mouths of the rivers Sarayka and Berdeush; on the left bank of the same river, on both sides of the mouth of the river Ai, and between the mouths of the Kuvash and Ak-bia.

The description of the mountains sufficiently indicates the

characters of the fluvial valleys. The valleys of the rivers Kussa and Arsha are deep, narrow, and wooded. The valley of the Aī is narrow and marshy at the upper end; lower down it widens on the right bank with gentle slopes, but the Urianga ridge hems it in with precipices on the left; below the bend where the river turns to the W., the valley is deep, narrow, and rocky. The valley of the Kuvash is at the upper end wide, with gentle declivities; at the lower end narrow and deep. The Satka is closely margined by precipitous mountains on the right bank; on the left are gentle declivities except in the part of its course where the river flows to the N.W. Of the affluents which join the Yúrezan from the right bank, the Sillia and Bulanka flow through wide valleys with gentle declivities, the Berioziak through a deep valley overhung by mountains. The valley of the Yúrezan is for the first 30 versts of its course narrow, marshy, and mountainous, particularly on the left side; between the mouth of the Túluk and the bend where the Yúrezan turns to the W. it narrows, but widens again below the bend, particularly on the right bank. The basin of the Bielaya, from its source to the mouth of the Ivaniak, has an oval form; it becomes contracted between the mouths of the Ivaniak and the Terlian, and continues narrow as far as the mouth of the Nura; below this it expands particularly on the right bank, till we reach the mouth of the Naya, where it again becomes narrow and frequently rocky. Of the affluents which the Bielaya receives on its left bank, the Ivaniak and Arsha flow through open valleys with gently undulating eminences; the Terlian and Nura through marshy glens overhung by mountains; the Uzian and Kutkur through deep but wide valleys; the Alla-Ruyan and Kurgas through deep and narrow valleys. The valley of the upper Nugush is broad, with gentle declivities; the valley of the upper and middle Uriuk is for the most part narrow, widening only where the stream is joined by considerable affluents. The valleys of the Shinshenek and Allakudash, affluents of the Zilim, are narrow and deep; that of the Zilim itself narrow, and in many places rocky. The upper basin of the Inzer is wooded and marshy, but pretty wide; it contracts below the mouth of the Yusha; below the mouth of the Suriniak it assumes the character of a barren gorge; below the mouth of the Kazymash the river has precipices alternately on the right and left banks, with patches of level meadow ground on opposite sides, enclosed by heights of the fourth class. The upper valley of the little Inzer (30 miles from N. to S.) is pretty open, the lower valley (from S. to N.) is narrow, widening only where the river is joined

by affluents. The valleys of the Tilmel and Reuat are deep, and in most places narrow. The mountains which enclose these valleys are almost everywhere covered with wood, but on the margins of the rivers are clear campaign land.

Few of the heights in this part of the Ural have been measured, and these only by means of the barometer. The following heights are taken from the statements of Kupffer and Helmersen:—

Mountain of the first class—

	Parisian feet.
Iremel (Helmersen) . . . . .	4747

Mountain of the second class—

Nazimskoi ridge (Kupffer) . . . . .	2140
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Mountains of the third class—

Mountains near the foundries on the right bank of the Saka (Kupffer) . . . . .	1652
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The summit level between Zlatoust and the foundries on the Saka (Kupffer) . . . . .	1791
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Valleys—

Sources of the Tyghyn at the foot of Iremel (Helmersen) . . . . .	3253
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„ „ Bielaya (Id.) . . . . .	1901
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Foundries of Bielorjetskoi (Id.) . . . . .	1543
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„ „ Uzianskoi (Id.) . . . . .	1273
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„ „ Kaghinskoi (Id.) . . . . .	1215
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Foundries on the Saka (Kupffer) . . . . .	975
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These data seem to indicate that the average elevation of this part of the Ural is about 2000 Parisian feet, and that its highest peaks do not exceed 5000 Parisian feet.

b. The western division of the western declivity of the central Ural is bounded by the western limits of the preceding division, and by the rivers Nugush, Bielaya, Sim, Eralka, Uskunda, Karamala, and Ai. In form it approaches to a parallelogram, its length is 280 versts, and its breadth 80. There is on the north of this part of the western slope a marked descent to the N.E., on the S. a slight descent to the S.W. The following rivers flow down the northern descent: the Tayruk to the N.N.W.; the Séléuk to the N.N.W.; the Zighan to the N.N.W.; the Usolka to the N.W. the Miayndy to the N.N.W.; the Zilim to the N.W.; the Askin-ca to the N.W.; the Bassa to the N.N.W.; the great Inzer to the N.W., and lower down to the W.; the Lemeza to the W., and lower down to the N.W.; the Uk to the W. and N.W.; the upper part of the Sim to the N.N.W.; the Katav to the N.N.W.; the Yurezeyn to the N.N.W.; the Ai to the W. The following rivers flow down the southern descent: the Nugush to the W.S.W.; the Uriuk



to the S.S.W.; the Surkanysh to the S.W.; the Tor to the S.W.

The heights in this division belong chiefly to the fifth class; the terraces of the fourth class occur, though rarely, and what mountains of the third class are met with can only be regarded as exceptional cases. Accordingly the fluvial valleys are for the most part narrow and very sinuous; neither deep nor marshy, and well wooded. The direction of the ridges in this division varies greatly.

Between the rivers Tor and Nugush there are three parallel ridges, extending from N.E. to S.W. All of them send off numerous branches in the direction of S. The most remarkable peaks are, Bish-Mughush, Takma-tau, Auvyary-tau, Tuktar and Kyrtilar.

Between the valleys of the Tor and Zighan one principal ridge extends to the S.W., along the right bank of the former river. The remaining space is occupied by three parallel chains of heights, with numerous branches, of which the main axes have a direction from S.S.W. to N.N.E. Five parallel chains of heights extend in the same direction between the rivers Miayndy and Zighan.

The space between the rivers Bielaya and Bassa, the lower valleys of the Inzer and Zighan, and the middle course of the Zilim, is occupied by five parallel ridges extending from N.N.E. to S.S.W. The first commences, under the name Maghash, on the right bank of the Askin, runs between the Zilim and the Usalka under the name of Lemian, and terminates about 10 versts from the mouth of the Zighan. The northern extremity of the second is known by the name of Turush-Arga; its middle points are called Kashbaldy-kazy; and the southern termination Bagrezy. The third has the name of Ulu-tau, between the Bassa and Zilim; and terminates on the S. between the Armet and Reuzak affluents of the Zighan. The fourth extends from the Bassa to the upper valley of the Miayndy: it is called in its middle parts Bushan. The fifth extends from the confluence of the Bassa and Minessa to the E. of the upper Miayndy; at its northern termination it is called Ulu-tash: on the banks of the Zilim, Tokada. These ridges do not form an uninterrupted chain, but are intersected by the valleys of the Zighan, Usolka, Miayndyn, and Zilim.

The space between the streams Bassa, Inzer, and the ridge Zilmerdak is occupied by three ridges, of which one, on the right bank of the Bassa, runs from N.N.W. to S.S.E.; the other two from N. to S.

The direction of the principal axis of elevation between the Inzer and the Lemeza is from E. to W. The Shigardak,

near the sources of the Lemeza, is the commencement of this ridge, which terminates at the mouth of the Inzer, on the right bank, in the rocky heights of Sikazy. The most remarkable peaks are Birian, Yalankas, and Bagriash. Long branches diverge from the main ridge; their direction is N. and S. The most remarkable are those which extend from the central mountain-knot Birian, the Setleuk (which stretches S. from the Bagriash), and the branch to the N.W., between the rivers Kurt and Lemeza.

Between the Lemeza and the Sim are also heights which have their axis of principal elevation in the direction of E. to W. The ridge begins at the mountain Masharysh, on the upper Sim, near the rivulet Bediarysh, and extends, 15 versts in length, to the mountain Baky, at the mouth of the Lemeza. The most remarkable peaks are — Sarnagaziñ, Zmeinoia (of the serpents), and Kizym. Some remarkable branches diverge from this chain both to N. and S.;—from the Masharysh, between the Lemeza and the Beidarysh, Zilagaïdy, and Billa-tor, which the ridge Miardiak connects with the Kariazi mountains; from the same mountain-knot a branch, which has no general name, runs out to the N.W., between the Kurak and the Sim; from the Zmeinoia (of serpents) the branch Kraka stretches to the S. between the rivers Bederish and Kissyk; from the same mountain-knot the Yavoskuz extends to the S.S.W., between the rivers Kisyk and Ikyn; a third branch runs off from the Zmeinoia to the N., between the rivers Asha and Kurak, which at first has no name, but which, after winding round the upper valley of the Uk, runs W. between that stream and the Sim, under the designation Asha-gherdiak (snowy mountains). A nameless ridge stretches N.W. from the Sarnagazú, between the rivers Ardagala and Asha; the Turkin branch diverges from the Kizym and extends S. between the rivers Ykin and Nu.

The space between the right bank of the Sim, the Katav, Umir, and Aï is full of heights which have their axis of principal elevation parallel to the fluvial basins—nearly N. and S.,—and which send off insignificant branches to the E. and W.

Of the heights now described the following are mountains of the third class: Zilagaïdy, Masharysh, Birian, Zmeinoia (of serpents), and Asha-gherdiak, or the snowy mountains. The principal axes and more important branches of the other ridges are a sort of intermediate form between the third and the fifth class; their minor branches belong to the fifth class. All these mountain-forms have this in common, that near the basin of the Bielaya they are bare, and in the other parts overgrown

with forest. The terraces of the fourth class occur frequently in the valley of the Zilim, between the mouths of the river Shenishiniak and Rewath; at two places on the right bank of the great Inzer; between the mouths of the Tuz and Aghardy; and on the right bank of the Lemeza, E. of the mouth of the Bediarysh.

The valley of the Uriuk and the valley of the Nugush above their junction are deep and narrow; below their junction the valley of the Nugush widens and has gentle slopes. The valleys of the Sukhanysh, Tor, Tayryk, and Setláuk have a similar open character. The valley of the Zighan, above the confluence of the Armet, is narrow and steep; its lower valley is open and gently sloping. The same description applies to the valley of the Úsolka. The Zilim flows from its source to the mouth of its affluent the Tokata through a very narrow valley; between the Tokata and Míayndy it widens; lower down it flows across a level plain, which preserves almost no characteristic feature of a valley. The valleys of the Míayndy and Askin are, throughout, wide with gentle declivities; the upper valley of the Bassa is narrow, the lower open, particularly on the left bank. The valley of the Inzer, above the mouth of the Bassa, winds through a flat meadow-land between two walls of rock, washing alternately in its meanderings the bases of the precipices on either side. Below the mouth of the Bassa it flows under the heights on the right bank, having the plain on the left. The valley of the Lemeza is deep and narrow above the mouth of the Kissyk; between that point and the mouth of the Ikyn it widens; for the remainder of its course the river has gentle declivities coming close to the right bank, and a vast marshy plain on the left. The upper valley of the Uk is closely shut in by hills; its lower, flat and marshy. The upper valley of the Sim has steep heights on the right, but is pretty wide. The valleys of the Katav and Yúrezeyn are narrow; the only gentle declivities present themselves at the mouths of their affluents.

No measurements whatever have been made of the elevation of this part of the western declivity, and it is mere conjecture that has estimated the average height of the mountains at between 800 and 1500 Parisian feet above the level of the sea.

c. The north-western division of the western declivity of the central mountain-region of the Ural is encompassed by the rivers Ufa, Sim, Aí, and Ik. Its declivity has two directions: to the S.W. in the lower valley of the Sim and the valleys of its affluents the Míniar and Asha; to the N.W. in the valleys of the rivers Yúrmash (flowing to the N.N.W.), Taúsh (to the



N.N.W.), Meleghez (to the N.N.W.), Dolgoi (to the N.W.), Saltabash (to the W.N.W.), Sherval (to the S.S.W.) Yaman-yelga (to the W.), lower course of the Yurezeyn (to the N.W.), Berdiash (to the W.), Krush (to the N.W.), lower course of the Ai (to the N.N.W.), lower course of the three Iks (to the W.).

The prevailing local form of the heights in this division is a transition from the Alpine formation to the plateau. The upper valleys of the water-courses are divided by syrts,\* more or less steep, which are rarely surmounted by rocky crests or peaks. These syrts rise from flat terraces, furrowed by water-courses, the direction of which is perpendicular to the direction of the syrts. The divisions of these water-courses assume sometimes the form of sharp ridges, but more frequently they are flat-backed like the syrts, of which they then appear to be lateral branches. The ridges in some places gradually sink down as they approach the beds of the rivers to the elevation of the central valley; in others they extend undepressed to the river-bank, their terminations in such cases forming steep and sometimes even rocky precipices. The principal ridges are three in number.

The first is the crest from which, as has already been noticed, two inclined planes dip, the one to the N.W., the other to the S.W. The direction of the crest from the upper course of the Uzkanda is semicircular, first to the N.W. and then curving round to the S.W. at the sources of the Saltabash. This crescent ridge is called Kara-tau. The continuation of the ridge, called Uvarash from the Saltabash, runs in a sinuous line with a general S.S.W. direction to the right bank of the Sim, near its mouth, where it terminates in a gentle slope. Several considerable branches diverge from both sides of this ridge. The Bianka mountains extend to the W. between the valleys of the Bianka and the Sim; the Worobyin (sparrow) mountains to the S.S.W., between the Asha and the Miniar, and other branches divide the valleys of the Yaman-yelga and Yurezeyk, and, in short, the valleys of all the affluents of the lower Ufa.

The second principal ridge runs to the N.W. between the valleys of the Yurezeyn and Ai. It winds round the sources of the Berdiash and the Krush, and terminates abruptly on the left bank of the Ai near its mouth. Branches of some consequence run out from the northern part of this ridge to the N.E. between the Bla-myz, the Lemeza, and the Kartia; to the S.S.E. between the Kashelewka and Kutium. Syrts run

\* Syrt is a word apparently of Tatar origin. The class of ridges which it designates are described by Pallas and by Erman.

out from the latter branch to the W. and to the S.S.W. between the rivers Krush and Berdiash, and between the affluents which join the Yurezeyn from its right bank.

The third principal ridge extends to the N.N.E., throwing out branches to the W., between the valleys of the Aï and the three Iks.

The principal syrts and lateral ridges in this division occur to the W. of a line drawn from the upper Miniär to the mouth of the great Ik. They are for the most part high and steep, and surmounted by peaks. The lateral ridges which divide the affluents received by the Yurezeyn from its right bank are also steep. The more western syrts and ridges present more gentle declivities, and are flat-backed. The declivities of the plateau-shaped syrts are for the most part steep and rocky:—in the basin of the Sim, between the mouths of the Miniär and Asha; in the valley of the Miniär; in the basin of the Yurezeyn, below the mouth of the Kashelevka; on the left bank of the Ufa, from the mouth of the Aï to that of the Saltabash; in the basin of the Aï, below the mouth of the great Ik; and in the valley of the north Ik.

The valley of the Sim is narrow from its source to the mouth of the Uk; thence wide, shallow, and marshy, especially on the left bank. The valleys of the Miniär and Asha are narrow and marshy. The valleys of the affluents which the Ufa receives on its left bank S. of the Saltabash open with gentle slopes; thence to the N. of that stream are narrow and precipitous. The valley of the Yurezeyn is pretty wide above the mouth of the Kashelerka; below it is narrow and precipitous, as are all the valleys of all the affluents which join it from the right bank. The basin of the Aï and the valleys of its affluents are in general wide and level.

All the heights of the N.W. division of the great western slope are wooded, with the exception of those which occur in the valley of the Aï, on the left bank of the north Ik, on the left bank of the Kiga, on the right bank of the Karta, in the basins of the Anziak and Sekiaz, and on the right side of the basin of the Yurezeyn, from the mouth of Karumala to the upper course of the Kashelevka. These regions are almost entirely destitute of trees.

No measurements of heights have been made in this division.

d. The southern division of the western declivity of the mountain region remains to be described. Within it is comprehended the space between the Nugush; the terminations of the ranges Massim, Bakal, Kraka; the central watershed of the Ural; and the watershed between the valleys of the Bielaya

and Ik. This division of the declivity slopes altogether to the W.S.W., and is occupied by the basin of the Bielaya, and the valleys of the Uzian and Kana, two affluents which join that river from its left bank.

The plateau formation predominates here, especially on the left bank of the Bielaya. Some of the syrta, however, have sharp-backed ridges, running from N. to S. The most remarkable of these chains of heights are:—The chain known by the names Suyar-Berdy and Kyngghy, which runs from the left bank of the Nugush, between the Shulgan and Buluk-Ulygan, affluents of the Bielaya, from the N.; the Karaghaily and Uimughata from the S.; the chain which under the names Suy-mysh, Tuzkaliu, and Kiyitz extends from the mouth of the Kamdeia to the upper course of the Kukulp; and the long ridges between the Nugush and the Bielaya, round the extremities of which the latter river turns to the N.; the Talytau, Büssurman, Balia, Uhandy, and Kúnghek. All these ridges are of inconsiderable height, but precipitous; their declivities are covered with wood, but their summits bare. The plateau slopes are steep and craggy.

It is only above the mouth of the Irtybek that precipices occur in the valley of the Bielaya; below, the valley widens on the right, and spreads into extensive levels. The affluents of the Bielaya, W. of the Irtybek, flow through shallow valleys; E. of that stream the valleys are narrow and deep. The Uzian flows in many places under overhanging crags.

In this division we know only two elevations from actual observation: for both we are indebted to Helmersen. The sources of the Kana are 2061 Parisian feet above the sea: the foundries of the Kananikolsk are situated at an elevation of 1386 Parisian feet.

C. THE EASTERN DECLIVITY.—This part of the central mountain region is of the same length as the western declivity. On the north its breadth does not exceed 30 versts; towards the sources of the Miass it gradually widens, till it attains a breadth of 80 versts; it thence narrows again, and at its southern extremity is not more than 50 versts. It is bounded by a line passing along the upper courses of the Sanarka and Koilga; through the curve which the Ul makes to the E.; and along the upper valley of the Gumbeika, as far as the mouth of the great Kizil. The E. declivity is composed of two subordinate slopes; one fronting to the N.N.E., occupied by the valleys of the Miass and the affluents which join it from the left bank; the other to the S.S.E., occupied by the upper valley of the Ul and the valleys of the Ural and the affluents it receives from its right bank.



On the N.N.E. slope we have only one observed altitude: Kupffer ascertained Miaskoi to be 933 Parisian feet above the level of the sea.

The angle of inclination of the S.S.E. slope has been determined by the following observations of Helmersen :

	Parisian feet.
To the E. —Mountain Ak-tiupa . . . . .	2460
To the S. W.—The ridge Irendyk, near the sources of the Kizil	2131
The sources of the Ural . . . . .	2026
Lake Ostrovnoi . . . . .	1191
Lake Uliandy . . . . .	1189
To the N. E.—Verghh Uralak . . . . .	1215
Magnitnaya . . . . .	998
To the S. E.—Kizilskaya . . . . .	905

The prevailing local forms in this region belong to the third and fifth classes of heights, which have been defined above. They form either barren ridges, on which nothing grows but the herb *kavyl*,\* with abrupt declivities, only one terrace, and inconsiderable rocky crests, or steppe-syrts,† with gentler declivities and no rocky crests.

The mountains of the third class occur in two chains of heights which run parallel to the central crest, or watershed, on the E. bank of the Miass: one which is called Ilmenski, from the source of the river to where it changes its original northern direction for an easterly one; the other, which is called Krykty and Irendyk, between the lakes Uzun-kul and Tolkash. To the same class belong several branches from the watershed on the W. side of the Miass valley. Most forms of the branches of the central range, however, and also of the branches of the Irendyk, belong to the fifth class. The southern division of the Ilmenski ridge extends from the sources of the Miass southward, as far as the bend of the Ui to the E. The triangular space between its southern terminus, the eastern branches of the central ridge, and the prolongation of the Krykty and Irendyk, is occupied by steppe-syrts, which form short ridges, having a general direction from N.N.E. to S.S.W.

The largest branches from the watershed on the eastern declivity are:—1. A branch which presents the appearance of two parallel ridges, and runs to the S.E., along the left bank of the Ur. It is well wooded; and on a high plain, between the ridges, is the picturesque lake Aush-kul. The principal

\* A plant which abounds in the deserts of S. Russia; it resembles the plume of feathers worn by Russian officers.

† The designation, *steppe-syrts*, occurs frequently in the sequel; it designates elevations destitute of wood and covered with "*kavyl*."

stony peak of this range rises from the N.W. margin of the lake. 2. A branch which runs between the rivers Miass and Iremel, at first in an E.S.E., afterwards in a N.N.E. direction. 3. A straggling range which extends to the N.E. down the valleys of the Miass and Atlian. Between this range and a smaller one, on the left bank of the Atlian, lies an extensive morass. 4. A branch between the Atlian and the Syrostan and Kushtungha. At first it presents the appearance of a narrow branch of the central ridge, with a S.E. direction; farther on it becomes a labyrinth of straggling heights, among which lies the extensive lake of Turgoiak. 5. Another branch between the Kushtungha and Kiolim diverges into five unimportant ridges.

All these heights belong to the third and fifth classes of the central-Uralian mountain forms. Their declivities are covered with forests. The upper valleys of the Miass, Iremel, and Atlian are open and marshy. The valley of the Kushtungha is narrow and marshy; the valley of the Kiolim has gentle slopes in its upper part, lower down it becomes precipitous.

The branches from the water-shed which occur in the western part of the upper Ural valley, as far as the mouth of the Pséulgan, are all short. Their peaks are of the third and fifth classes. These ridges divide the deep woody valleys of the Baral and Birsia, and the more open and level valleys of the Kurghash, Teste, and Pséulgan. Long ridges of steppe-syrts occur in the basin of the Mindiash, between its affluents the Tadil-gail, Riastak, and Shaghir.

The Ilmen hills form an unbroken ridge, extending from S. to N. The part of this ridge which is S. of Tchabarikulskoi consists of steppe-syrts; but the heights N. of lake Tchabar belong to the third class. Short branches run out from them in a N.W. direction, terminating in precipices in the valley of the Miass. The eastern branches sink insensibly to the level of the low valleys in that direction. The northern part of the Ilmen hills is covered with wood. The western valleys are short, deep, and precipitous. A number of extensive lakes are scattered among the terraces which run out to the E.: lakes Argazei, Miaskovo, Karasseie, Aghardiak, great and little Kisagash, Tchabar-kul, and Elanjik. The basins of these lakes are surrounded by steep steppe-syrts, and their margins are for the most part low.

Near the sources of the Mindiash begins the chain called Krykty, between the Mindiash and the great Kizil, and Irendyk in its southern prolongation. It is 10 versts in

breadth, and runs parallel to the central ridge, at a distance varying from 5 to 15 versts. The southern termination is a crest of the terrace-slope of the southern part of the central mountain region. The Krykty or Irendyk forms groups of heights intersected by the rivers great and little Kizil, closely resembling the groups which constitute the Kraka heights along the summit-level, which run parallel to it. The prolongation of the ridge into the southern division of the central mountain region is, on the contrary, a continuous ridge. The axis of greatest elevation is the same in all the three divisions of this range—in the division between the Mindiash and the little Kizil, in that between the little and the great Kizil, and in that between the great Kizil and lake Tolkash. The direction of the summit of the ridge is sinuous, but with a general bearing of N. to S. The average breadth of the chains is only 2 versts, and it nowhere exceeds 5. The slopes are steep, and their surfaces covered alternately with forests and morasses. The flat summit is intersected by a rocky crest which, in some places, rises into peaks. The branches which run out on either side of the axis of greatest elevation are short, and connect it with the parallel chains of heights on the E. and W.

The western chain is 5 versts in breadth between the great and little Kizil, and presents ramified embranchments, intersected by the affluents of the great Kizil. It terminates to the S. of the great Kizil in the oblong height of Tair-tau, near the junction of the Sharly with the Sakmara. The peaks composing this chain belong to the third and fifth classes. The lower elevations which connect them are deep and narrow, filled in the upper parts with debris, and marshy lower down.

The E. branches of the axis of greatest elevation of the Krykty and Irendyk connect it with a similar parallel lateral chain, which begins on the left bank of the Mindiash, and terminates on the left banks of the Karasan and little Kizil. It has an average breadth of 8 versts. The heights of this chain also present the appearance of mountain groups intersected by fluvial basins. The predominant direction of the ridges is from N.N.E. to S.S.W. A few of the heights belong to the third class of Uralian mountain forms, but the far greater number are either of the fifth, or are steppe-syrts. Three branches, which deserve notice, diverge from the central axis of Irendyk, opposite the southern termination of the eastern chain. They run to the E., separating the valleys of the Karasan, the Tarakhta, the Ziam, and the upper parts of the Khudolaz.



The depressions by which the E. chain, and the branches just named, are intersected, are much more wide and open than the depressions of the W. chain.

Like the N.E. branches of the central Ural, they occasionally contain within their recesses extensive bogs or lakes. The most remarkable lakes that occur between the central axis of the Krykty and the E. chain are—1. The lake Uzunkul, with the bogs extending from it to the S.; the river Bisghia flows through this lake. 2. The lakes Kara-balyk and Bannoïe, from which last issues one of the confluent of the Yanghelka. 3. The two lakes Baghdadak are on the E. side of the chain. An extensive tract of marshy country spreads to the S. to the banks of the little Kizil; to the lakes Tchortanly, Gorkoïe, Martytchechïe, united by a tract of morasses with each other, and with the Bannoïe, Ostrovnoye, Travnoïe, and which extends as far as the great Kizil. Between the E. chain and the central axis are the valleys of the little and great Kizyl, and the Sakmara. The valley of the little Kizil falls to the N.; the valleys of the great Kizil and Sakmara to the S. Their affluents descend the gentle slopes of the flat-backed branches of the Ural.

The remainder of the E. declivity consists of two inclined planes; one, in which are the valleys of the Uï and Kydash, dips to the S.S.E.; the other, in which are the valleys of the Ural and Urlada, to the S.S.W. The surface of both of these slopes is furrowed by steppe-syrts, which attain their greatest development between the right bank of the Uï, the Urlada, and the Ural. The steppe-syrts upon these rivers range uniformly N.N.E. to S.S.W.; the other steppe-syrts of this region deviate more or less from this normal direction. The hollows between these heights are broad and open; they have in general precipitous rocks on one side and gentle declivities on the other; their forms are intermediate between those of the Alpine region and the S.E. advanced range.

The only heights on the E. declivity that have been ascertained by observation are enumerated above.

## 2. THE SOUTHERN OR PLATEAU DIVISION.

The circumscribing outline of the southern part of the central mountain region is an irregular trapezium; the N. and S. sides measure 160 versts in a straight line, the W. about 135 versts, and the E. 180 versts. The direction of the declivity, as indicated by the courses of the principal rivers, is from N.N.E. to S.S.W.; and the angle of depression, judging from the results of Helmersen's barometrical observations, must be considerable.

Parisian feet.

To the N.E.—Urtazymaskaia . . . . .	640
Kizilskaia . . . . .	905
Sources of the Urtazym . . . . .	974
"    "    Kússteba . . . . .	1990
"    "    Yelan-Zilayir . . . . .	2021
To the N.W.—Source of the little Ik . . . . .	1735
To the S.E.—The fort of Orsk . . . . .	571
The redoubt Podgornoï, on the Ural . . . . .	442
The station Ghiryalskaya, on the Ural . . . . .	339
The redoubt Toltoï . . . . .	467
The fort Vozdvisjenskoï, on the Sakmara . . . . .	421
The village Spaskoï, on the Ik . . . . .	390
To the S.W.—The valley of the Khana . . . . .	548

The surface of the trapezium has the appearance of an elevated plain, enclosed on all sides by an amphitheatre of mountains, which constitute the crests and external terrace-slopes of the central plateau.

The plateau approaches in form to a parallelogram 200 versts in length from N.W. to S.E., and 70 versts in breadth. The mountain-forms within this space embrace every intermediate grade of transition from the broad flat-backed syrt to the steep sharp ridge. The surface of the former is in some parts undulated by round hills. Their slopes present various aspects in different places. For the most part they have gentle declivities intersected by shallow ravines. Where these ravines are most numerous and shallow the declivities become more steep, sometimes even precipitous. The narrow ridges have either gentle declivities at top and steep terraces at the base, or gentle slopes at the base with steep sharp-backed ridges. The third local form of this plateau is a crest surmounted by peaks, which have steep bases, and terminate either in rounded cones or bare rugged rocks. The bases of these peaks are in general overgrown with kavyl, though some of them are clothed with wood. For the most part the trees are found only on the slopes which front to the E. and N. The hollows between the first class of syrts are, for the most part, broad with gently-sloping sides; those between the second class of syrts narrow, with steep sides, assuming in some places the character of defiles; those between the syrts of the third class have gentle declivities, but are in general narrow.

The manner in which these local forms are grouped and the intermediate forms of transition from one to the other are numerous and varied. The axes of principal elevation, forming watersheds, assume most frequently the forms of

the first and second class ; in the branches dividing affluents of the same drainage-basin the third form is most prevalent.

a. SURFACE OF THE PLATEAU.—Taking the distribution of the local forms for a guide the central plateau may be regarded as divided into two parts, of widely-differing characters, by the valley of the Sakmara. The northern part of the plateau is clothed with almost impenetrable forest, while the southern is utterly destitute of wood, with the exception of an insignificant space between the sources of the Guberliā and the bend of the Sakmara to the W.; in the eastern part all the three local forms are found, in the western the first predominates, the second is seldom met with, and the third not at all. The northern part of the central plateau may be further subdivided by a line drawn from the mouth of the Yelan-Zilayir to the Urman-Zilayir, and upwards along the bed of the latter. To the W. of this line are found syrts with flat summits and steep sides ; to the E. steppe-syrts, in some places those which are covered with kavył, but more frequently those which have woods on their E. and N. declivities. The fluvial basins in the W. subdivision of the N. part of the plateau rarely exceed half a verst and never a whole verst in breadth ; those of the E. subdivision are somewhat wider and have generally precipitous sides. The southern part of the plateau is also divided into two unlike parts. In that to the N.E., which is the larger, syrts of the first class and wide shallow ravines prevail. The S.W. part contains the valley of the Guberliā and the valleys of the affluents which join the Sakmara from the left bank. The syrts which divide the latter are narrow and ramified, and their steep channelled terraces or crags overhang the beds of the rivers. The heights on the Guberliā are more flat-backed, but their sides are equally steep. The fluvial basins in this part are consequently narrower and deeper than those to the N.E.

The average altitude of the central plateau has been determined by the barometrical observations of Helmersen.

	In the N. part.	Parisian Feet.
Heights :—Sources of the Kússīcha . . . .		1990
"      "      Yelan-Zilayir . . . .		2021
"      "      Little Ik . . . .		1735
"      "      Kasmarka . . . .		1450
Valleys :—Village of Yúluh . . . .		1480
Foundries of Preobrajensk . . . .		1323
	In the S. part.	
Heights :—Sources of the Guberliā . . . .		1329
Watershed between the Turat and Guberliā . . . .		1263
Valley :—Of the Taakla . . . .		1059
Surface of Water :—Of the Sakmara near the mouth of the Yelan-Zilayir . . . .		1201



It appears from these data that the extreme difference of altitude between the N. and S. parts of the central mountain region amounts to no less than 2700 feet; and that the difference of altitude between the hills exceeds the difference between the valleys. The heights in the N. part exceed the greatest heights in the S. part by 700 feet; the difference of elevation between their valleys does not exceed 300 feet.

b. *N. TERRACE*.—The plateau is bounded on the N. by the watershed between the Bielaya and the Ural. Its crest begins at the principal western advanced range of the Irendyk. As far as the sources of the little Ik its declivity is almost imperceptible; further W. it assumes the form of a broad-backed syrt, with one terrace, which runs in a sinuous line to the W., throwing out branches surmounted occasionally by peaks between the affluents of the Bielaya, and descending to the bed of the great Ik by steep declivities and cliffs. The ravines between the branches are narrow and deep, and like the watershed itself overgrown with wood. The length of this watershed, in a straight line, is 75 versts; but measured along the sinuosities of the crest it is 110 versts. Its altitude has not been ascertained, but the principal peaks must rise at least 200 feet above the sources of the Kana, Yelan-Zilayir, and great Ik.

c. *N.E. TERRACE*.—The N.E. side is bounded by the southern prolongation of the Irendyk mountains. The central range of the Irendyk has the form of an almost rectangular triangle, with the base to the N., of which the W. side is about 60 and the N. side 30 versts in length. When the southern prolongation of the central axis is added the space occupied by the whole is almost a parallelogram 60 versts long and 49 broad. The heights of the southern prolongation belong to the fourth and fifth classes of the mountain-forms, and to the first and second classes of steppe-syrts. The valleys have the same character as those in the N. part of the Irendyk, except that large lakes and morasses are of rare occurrence.

The southern prolongation of the Irendyk is a watershed. To the N. of the lake Tolkash, which it approaches within two versts, it runs in a sinuous line with a general S.S.E. direction; in the latitude of that lake it takes a S. direction. Where it turns to the S. it is 5 versts distant from the river Tanalyk; this distance gradually increases to 10 versts; but at the S. termination of the ridge it is again diminished to two versts. The portion of that part of the Irendyk which we are now describing, N. of the lake Tolkash, belongs to the mountains of the third class. It is covered with an almost impenetrable forest of birches, ashes, and larches. The portion to the S. of

the point where it assumes a southern direction is only lined in some places with straggling pine-trees. Twenty versts from its S. termination the prolongation of the Irendyk assumes the form of three parallel steppe-syrt ridges of the first class.

The western branches of the prolonged Irendyk do not exceed five versts in length, and they preserve the characteristics of the central axis, terminating in abrupt declivities either on the eastern verge of the morass which lies N. and S. of lake Tolkash, or on the very brink of the lake, or of the Tanalyk. A branch diverges from the central ridge, where it turns to the S. and extends to the S.S.W. between the valleys of the Yúlan and Tanalyk. It is the only branch in that part of the ridge, and belongs to the steppe-syrts of the first class. A number of gently-sloping ridges, connecting steppe-syrts of the first class, run out from the S. extremity of the Irendyk.

From lake Tolkash to the sources of the Asali the western advanced ridge of the Irendyk is composed of a chain of steppe-syrts of the first class, extending from N. to S. Between the sources of the Asali, the Akmurun, and the Bazaulyk they make a bend to the W.S.W., and form a mountain-labyrinth of steppe-syrts of the first class. At the upper valley of the Bazaulyk they again turn to the S., and in the form of two parallel chains of steppe-syrts of the second class separate the valley of that river from the valley of the Tanalyk.

To the W. of the advanced range which has just been described a chain of steppe-syrts of the first class runs from N. to S. along the left bank of the Sakmara. This is the southern extremity of the Tair-tau. It is separated from the advanced range of the Irendyk by a wide elevated plain, as the advanced range itself is separated from the branches of the central ridge by the basin of lake Tolkash and the valley of the Tanalyk. The basin is deep; the valley is wide and shallow as far as the point where the closest approach of the advanced range narrows it. To the south it widens again and retains the character of a level plain.

The prolongation of the Irendyk sends out more and more important branches to the E., especially in its northern parts. The direction of these branches is perpendicular to the axis of greatest elevation; they belong to the third class of mountain-forms, and divide the valleys of the affluents which join the Khúdolaz and Urtazym from the W. Among the largest of these is a double branch, which runs along both banks of the Sapsal, divides the sources of the Khúdolaz and Urtazym, and almost reaches the congeries of ridges which extends N. and S. from the upper valley of the Khúdolaz to the

The most remarkable branch thrown out to the E. from the central point of the Irendyk approaches the right bank of the Urtazym, opposite the southern extremity of the ridge just described. Its heights are of the third class of mountain-forms. Syrt ridges of the second class, connecting isolated steppe-syrts of the first class, diverge from the southern part of its central axis, and separate the valleys of the affluents which the Urtazym receives from its right bank. Their average length is about 10 versts. The valleys between them correspond to the character of the heights.

	Parisian feet.
Heights.—Highest summit of the prolongation of the Irendyk	2942
"          "          southern extremity of the	
prolongation of the Irendyk . . . . .	1497
"          "          advanced range W. of lake Tolkash	1970
Valleys.—Sources of the little Urtazym . . . . .	974
Surface of the waters.—Lake Tolkash . . . . .	1626
The Sakmara, near the mouth of the	
Elan-Zilayir . . . . .	1231

d. S.E. TERRACE.—The S.E. terrace-slope consists of a range of syrts, 10 versts broad, and extending 100 versts in length from the little Urtazym to the great bend of the Ural, where it turns to the W. The N. termination of this ridge is connected with the S.W. termination of the Irendyk, by an intermediate group of heights. The prevailing local form along the S.E. terrace is that of the steppe-syrt, with gentle slopes; it is only in a few instances that they are surmounted by crests, or that their lower terraces form precipices close to the beds of the rivers.



The most considerable elevations occur in the upper valleys of the Kaziatash and Makan; on the left bank of the Tanalyk where it bends to the S.E.; on the right bank of the same river opposite the mouth of the Makan; on the upper part of the mountain valley Kuvatskoy; and near the mouths of the Yelshanka where the Ural turns to the W. Precipitous descents occur on the right bank of the Ural between the Terikla and the Tanalyk, and in the lower valley of the latter river.

The elevation of these syrts has not been determined; but they do not appear to rise above the medium elevation of the plateau.

c. S. TERRACE.—The southern terrace-slope is formed by a mountainous parallelogram, bounded by the upper part of the mountain valleys of Krasnoï and Razboïnoy, the rivers Bannoya and Kosimova, and the rivers Ural and Konoplianka. It is 20 versts broad from N. to S., and 35 long from E. to W. Small, sharp, stony ridges predominate, with crests surmounted by conical and pyramidal peaks, and undulating declivities, frequently intersected by bare rocks, or covered with débris. The peaks as well as the declivities are channeled with ravines and hollows of different dimensions. The hollows between the peaks, which belong to the first class of syrt forms, are deep with precipitous sides. Where few branches diverge from the range the crests diminish, and their sides pass into gentle slopes. In these parts the hollows are more open and shallow. The whole of the range is utterly destitute of wood. The great number of mutually intersecting ravines give the heights the appearance of being isolated. Steep rocky cliffs appear in the valley of the Ural, on the left bank of the great Guberlia, and in the middle of the terrace. The mountains between the Tchebakla and the Konoplianka have fewer branches and ravines. At the S. extremity of the flat-backed syrt, between the upper part of the mountain valley Krasnoï, the great bend of the Ural to the W., and the Gorium, heights of an almost semi-globular form, surmounted by peaks, predominate.

The observations of Helmersen give the following elevations on this terrace:—

	Parisian feet.
Height.—Mountain of Guberlinsk . . . . .	905
Valleys.—Fort Guberlinskoï . . . . .	483
Detached fort Khabarnoï . . . . .	494
Surface of water.—The Ural, at the redoubt Podgornoï . . . . .	442

f. W. TERRACE.—The figure of the W. terrace-slope is irregular. The N. side is 30 versts long in a straight line,

the direction from E.S.E. to W.S.W.; the W. side is 125 versts in the direction from N.N.W. to S.S.E.; the S. side 90 versts in the direction from W.N.W. to E.S.E. The E. side is a line with two curves: its direction for the first 85 versts from the S.E. angle of the terrace is to the N.N.W.; for the next 20 to the W.; and for the remaining 80 to N.N.W.

The local forms in this terrace-slope are extremely varied:—  
1st. Broad syrts, with flat summits and gentle slopes. 2nd. Broad syrts, with flat summits and precipitous lower terraces. 3rd. Syrts with narrow crests, rising either from precipitous or sloping bases. 4th. Sharp-backed (hog-backed) syrts, with one side precipitous, surmounted by small dome-shaped peaks. 5th. A range of mountains, rising from a plateau, with a serrated crest. 6th. Some short ridges of a similar character. 7th. Parallel chains of oblong heights, connected by elevated plains of small extent: this form is almost exclusively confined to the W. terrace. 8th. Isolated dome-shaped elevations, with smooth or channeled sides: these are met with on plains, and on the summits of flat ridges. All these heights are popularly classified under forest or steppe heights, according as they are covered with wood or “kavyl.”

The variety of local forms, and the various modes in which they are grouped, lend a diversified character to the valleys which are found among them. Among the forms of the second, third, and fifth classes the valleys are narrow and deep, and consist not unfrequently of a series of cauldron-shaped depressions, enclosed within the numerous branches that extend at right angles to the axes of the principal chains. Among the mountain forms of the fourth and seventh classes the valleys are for the most part wide and open. The heights of the first and eighth classes are separated extensive undulating plains.

The whole western terrace is divided by two plains or valleys into three nearly equal parts:—the central, the south-eastern, and extreme western parts.

The central part of the western terrace extends from the valley of the Ural to the Bielaya. Its ground-plan may be compared to two trapeziums, the shortest sides of which meet in the valley of the Uskalyk. The direction of the line of junction of these trapeziums is from W. to E., and its length does not exceed 15 versts. The northern boundary of the central part of the W. terrace is about 25, and the southern about 35 versts. The central part extends in all about 100 versts from N. to S.

The predominant local forms differ in the two trapeziums into which this part is divided: those of the second, third, and fifth classes occur most frequently in the northern. The W. portion

of this trapezium is full of plateau-shaped syrts, with their axes of greatest elevation in the direction of W. to E. These syrts form the watersheds of considerable rivers. Peaks of the eighth form rise from their summits; and branches at right angles to the axis of principal elevation are frequent, and sometimes change into sharp-backed ridges, intersected by precipitous ravines and chains of cauldrons. The most remarkable of these syrts, for its height and precipitous character, extends between the rivers Yemashla and Uskalyk. A system of ridges of the fifth form, connected with this syrt, runs from N. to S., across the basins of several rivers. Its ground-plan has the figure of a triangle, with its N. angle at the upper valley of the Kasnakta, an affluent which the great Ik receives from its right bank; its S. angle on the Uskalyk, about five versts from its mouth; and its E. angle between the sources of the Iniak and Suran. The greatest elevation occurs between the two last-mentioned rivers, and from it the heights sink to the N.W. and to the S.W. This system consists of two principal ridges towards the N. and S. angles, and towards the centre of four, connected by a great number of branches. The syrts and the triangular system of heights are covered with wood, except at the S.W. extremity of the latter. The northern trapezium is intersected by seven principal fluvial valleys:—By the lower valley of the little Ik, which in this part of its course flows to the W.S.W.; the central valley of the great Ik, which flows at first to the W., and lower down to the N.W.; the valley of the Iniak, which flows in its upper course to the S.W., lower down to the N.W.; the upper valley of the Urgheh; the valleys of the two Surans, flowing to the S.S.W. The affluents of these rivers are numerous, and almost all of them from N. to S. The valleys are generally deep, narrow, and thickly wooded.

The southern trapezium is divided by the rivers Sakmara and Kasmarka into three parts. That which lies to the N. is a perfect mountain labyrinth. Along its W. border runs a chain of lateral ridges, crossed by the valleys of the Apel and Belegush, which consists at its N. extremity of heights of the sixth form, and at its S. extremity of heights of the seventh form. To the W. of this are some advanced ranges: those situated between the lower valleys of the Assell and Belegush are particularly deserving of notice. Heights of the sixth class predominate on the east side of the chain, between the rivers Assell and Uskalyk; heights of the sixth and seventh classes between the rivers Assell and Kasmarka; and heights of the fourth and seventh classes between the rivers Irbel, Kapkal, and Zirgaysh. Only some straggling firs are found on these heights. The axes of greatest elevation in the ridges of the fourth and



sixth have the direction from N. to S; of those of the seventh class from E. to W. The valleys are wide and open, except in the lateral chain, where they form deep gorges. The space between the Kasmarka and Sakmara is bounded on the W. by the continuation of the lateral chain, which consists here of from two to four rows of heights of the sixth class, round which the Sakmara curves to the N.N.W. East of this chain is a plain, intersected by several rows of syrts of the fourth class, connected by one axis of principal elevation, which extends in a sinuous line from E. to W. Between the rivers Sakmara and Ural, the lateral chain still continues to run on the W., in the form of two flat-backed syrts, which terminate near the Yelshanka. Eastwards from these syrts parallel rows of heights of the sixth class extend from N.N.W. to S.S.E., unconnected by any perceptible common axis. The valleys of the Kasmarka and the Sakmara, and of the affluents of the Sakmara and the Ural are, with a few exceptions, wide and open.

The central part of the W. terrace is divided from the south-eastern by an elevated plain, which is not more than 1 verst in breadth, between the Akberda and the Assell; between the S. bank of the Assell and the Kasmarka it widens to 4 versts, and between the Kasmarka and Sakmara it attains in some places a breadth of 10 versts; on the left bank of the Sakmara it again narrows, but south of that river it widens once more, and on the bank of the Ural between the mouths of the Aksakal and Belenghia is nearly 10 versts broad. The level surface of this plain is broken only in few places by inconsiderable syrts: on the right bank of the Assell, at the upper valley of the Zirgaysh, between the lower valleys of the Zirgaysh and Idiasn, and on the left bank of the Sakmara.

The figure of the S.E. part of the W. terrace is irregular. The northern side measures 40 versts from W.N.W. to E.S.E., the western 85 versts from N.W. to S.E., the southern 25 versts from W.N.W. to E.S.E., and the eastern 80 versts from N.N.W. to S.S.E. Between the Sakmara and Akberda, on the north-western border of this part, is a mountain-range 15 versts broad, crossed by the valleys of the Assell, Idiasn, Kasmarka, and Kurüyül. Ridges of the sixth class, with their axes of principal elevation in the direction from N. to S., predominate to the N. of the Assell. Between the Assell and Kasmarka are straggling heights of the fourth class; their axes of principal elevation run from N. to S., their western branches are precipitous, their eastern have gentle declivities. All these heights are wooded. East of the Kasmarka are naked hills of the fourth and eighth classes. The north-eastern border of the part now under review has between the

Kurúyúl and Sakmara a plateau formation, sinking by abrupt declivities to those rivers. The axis of greatest elevation is coincident with a broad-backed sinuous syrt-ridge, which has a general direction from N. to S. The wooded terraces of the E. declivity of the plateau are furrowed by a great number of ravines divided by sharp-backed ridges with precipitous sides. The western declivity is bare and surmounted by the chain of high peaks known by the name of Yaútubia. It commences at the upper basin of the Kurúyúl, about half a verst from the watershed, from which it in some places diverges to a distance of 5 versts, and by which it is intersected at the sources of the Blaush. These peaks belong to the local forms of the eighth class, but the terrace which they surmount to the third. An elevated plain intervenes between this plateau and the mountain-range N. of the Assell. South of the plateau, between the middle course of the Kurúyúl, the bend of the Sakmara to the W., the lower valley of the Kuragan, and the upper valleys of the affluents it receives from its right bank, are elevations of the second, third, and eighth classes, steep and sharp-backed, especially at the bend of the Sakmara and on the Kuragan. A chain of syrts of the fourth class, destitute of wood, extends between the Sakmara, the Ural, and the left bank of the Kuragan. The direction of their axis of principal elevation is from N.N.W. to E.S.E. Syrt-branches diverge from this chain towards the S. in three places; the largest extends from the upper valley of the Griaznushka to the Pismiánka.

The central part of the western terrace is separated from the extreme western part to the N. by the lower valley of the great Ik, to the S. by an elevated plain. The lower valley of the great Ik has an average breadth of 10 to 15 versts. It is narrowest at the mouths of the Súran and Uskalyk. The character of the valley is open and level. The elevated plain extends from the mouth of the Ik S.S.E. along the left bank of the Sakmara to the bank of the Ural, where it sinks by gentle slopes to the level of the valley near the mouth of the Kasimka. The plain is 10 versts broad from the mouth of the Ik to where the Sakmara turns to the N.W.; thence to the Ural it is 5 versts broad.

The form of the ground-plan of the extreme western part of the W. terrace is a trapezium. The N. side measures 35 versts from W.S.W. to E.N.E.; the W. side 120 versts from N.N.W. to S.S.E.; the S. side 20 versts from W.N.W. to E.S.E.; and the E. side 130 versts from N. to S.

This part is divided by the Yelan-tashla and the lower valley of the Urman-tashla into two portions, the characteristic sea-

tures of which are different. The N. portion, of a triangular form, is occupied by three ridges, which diverge from the watershed between the Ural and Bielaya at a distance of 15 and 8 versts from each other. The most easterly of these ridges is bare, and runs due S. to the mouth of the Urman-tashla. The other two are wooded in their central parts, and extend S.S.E. to the mouth of the Yelan-tashla. All three belong to the fifth class of local forms; they have steep declivities to the W. and gentle declivities to the E.; they have few branches. The S. portion contains several groups of steppe-syrts. The first is situated between the upper valley of the Yelan-yúshatyрка, the Yaman-bulak, and the right bank of the Yelan-tashla. Its heights belong partly to the eighth and partly to the fourth class. It is connected with two other groups of syrts of the fourth class; one of which is on the left bank of the Yaman-bulak, and the other between the upper valleys of the affluents which that river receives from its right bank and the sources of the Yelan-yúshatyрка. A gently-sloping syrt extends in a crescent form from these groups to a fourth, which rises among the sources of the Sukulak, Kizlaír, and Uluguz, and contains heights of the fourth and sixth classes. A fifth group is formed by two ridges which extend from the upper Saper and the Kuperle to the Ural. The W. ridge belongs to the eighth, the E. and its branches belong to the fourth class.

Few elevations of the western terrace have been ascertained; the following data communicated by Helmersen afford matter for an approximative estimate:—

	Parisian Feet.
Heights:—Verbluya, or Camel Mountain	920
Mount Ghirialskoí	1018
Mountain at the Confluence of the Dubiaka and Khana	1017
Mountain Malinovaia	1251
Ridge on the right bank of the Kirba	1215
Valleys:—Redoubt Sheltoí	467
Valley of the Khana	548
Valley of the Kirba	581
Surface of water:—The Ural near mount Ghirialskoí	339
The Ural near Verchne Ozernoia	354
The Sakmara near the mouth of the Yantchura	528
The Ik near the mouth of the Kirba	387
The Sakmara near the mouth of the Kait	495

## II.—THE WESTERN ADVANCED RANGE.

The space between the Bielaya, Tama, Volga, and Ural, is occupied by an extensive plateau, which forms the W. advanced range of the Uralian ridge.

This plateau has four principal declivities: to the N., to the



W., to the S.E., and to the S. The crest in which these acclivities meet is marked by a flat-backed syrt, called by the inhabitants of the region the *Obtchei* (common) Syrt. This syrt is merely the axis of principal elevation of the advanced range of the Ural, though geographers, who, like Buache, assume mountains wherever there is a watershed, have made a mountain range of it. A branch of this crest extends sinuously with a general N.W. direction from the bend which the *Bielaya* makes to the W., as far as the upper valley of the *Tchereinshan*. A second branch parts from the first between the sources of the *Kinel* and *Salmyj*, and stretches southward with a slight curve to the E., to the upper valley of the *Samara*; thence winding round the sources of that river, it gives out, between the *Volga* and *Ural*, a third branch which runs from E. to W.

There is little variety in the local forms of the *Obtchei* syrt. Where the declivities are gentle there are generally two or three terraces between the base and the flat summit; but where the syrt is intersected by ravines or fluvial basins, the depressions are divided by precipitous syrts with dome-shaped or pointed summits. This latter form shows itself most frequently in the S.E. part of the first branch, in the southern part of the second, and the eastern part of the third branch. All the three branches are bare of trees, with the exception of a few straggling pines in the valleys, principally in the valleys of the first branch.

The following are the only elevations in this part of the W. advanced range that have been ascertained by observation:—

	Parisian feet.
Bugulma (Kupffer) . . . . .	711
Near the lower <i>Ozernoi</i> (Helmersen) . . . . .	501

The eastern part of the *Obtchei* syrt is apparently higher than the western, for the waters of the former are drained into the *Bielaya*, while those of the latter find their way into the *Kama* and the *Volga*. Probably the N. and E. heights of the *Obtchei* syrt attain an elevation of from 800 to 900 feet.

The N. declivity of the *Obtchei* syrt extends northward from the first branch to the rivers *Kama* and *Bielaya*. It has three subordinate declivities. That which dips to the N.N.W. is channeled by the rivers *Ashkadar*, *Kuganak*, *Karmala*, *Urshak*, *Dioma*, *Karmasan*, and *Tchermasan*. The declivity which dips to the N. contains the valleys of the rivers *Baza*, *Siim*, and *Ik*. The third subordinate declivity dips to the N.N.W., and contains the valleys of the *Sheshma*, *Zai*, and *Kutchui*. The surface of this descent may be divided into two principal terraces. The upper terrace extends downwards

from the Obtchei syrt to a line drawn across the sources of the Irna, Menzela, Siún, Baza, and Karmazan; the lower one slopes downward from that line to the low plain that skirts the banks of the Kama and the Bielaya.

The syrts which divide the basins of the principal rivers along this declivity are broad and flat-backed; those which divide the valleys of their affluents are narrower, and assume in some places the form of sharp-backed steppe-syrts. Syrts occur both with steep and gentle slopes. The gentle declivities sink down to the valleys in a prolonged slope or in a succession of terraces; those which are steep sometimes terminate on the fluvial valleys in almost perpendicular walls covered with grass, sometimes in rounded projections with hollows between them. In some places the grass disappears, and the naked earth presents itself, pierced here and there by rocks of sandstone or limestone. The steep slopes, with their intersecting ravines, have, when seen from the valley, quite the appearance of Alpine scenery; but when the ascent is surmounted nothing meets the eye but a level steppe, on the surface of which even inconsiderable hills can scarcely be discerned. Both the steep and the gentle declivities are for the most part devoid of trees; but the summits of the plateau are covered with forests, especially at the sources of the Dioma, Tiater, and Ashkadar; on the right sides of the lower valleys of the Urshak, Dioma, and Tchermasan; between the left bank of the Ik, the upper valleys of the affluents which the Dioma receives on its left bank, and the left bank of the Kurgai; at the mouth of the Ik, on the left bank; on the right sides of the valleys of the Zai, Kychui, and Sheshma.

The valleys of the northern declivity are for the most part deep, particularly in the first terrace; but they are wide, and consequently open, except those of the smaller affluents, and at the places of those of large rivers, where steep cliffs approach the bed of the river on both sides. In some places the cliffs run close to the river; at others they alternately approach and recede from it, inclosing level meadows within their curves. The distribution of the local forms is remarkable on account of its extraordinary regularity. The basins of the larger affluents of the Bielaya and Kama are, with few exceptions, in most places, steep on the right bank of the river, and gently sloping on the left. It is only at the great bends, where a river changes the direction of its course, that abrupt descents are found on both banks narrowing the valley. The valleys of the affluents of the second class, which join those of the first from their left banks, have also their right sides steep and their left gently sloping; but this

arrangement is reversed in the valleys of those which join from the left bank.

The second principal declivity of the western advanced range, or outlying plateau, occupies the S. descent of the first branch, the western descent of the second branch, and the northern descent of the third. The E. part slopes to the N.W., and the W. to the S.W. The bends where the principal rivers which flow down this declivity change the direction of their courses, mark the line of separation between the two sub-declivities. The rivers are:—

The Buzuluk, which flows in its upper course to the W.N.W., lower down to the N.N.E.

The Metcha, which flows throughout to W.N.W.

The two Irghiz, which flow throughout to the W.

The Samara, upper course to N.W., lower to W.

The two Shurans, upper course to N.W., lower to S.W.

The Tok, upper course to N.N.W., lower to S.W.

The Borovka, upper course to N.N.W., lower to S.W.

The Kutuluk, upper course to W., lower to N.N.W.

The Kinelchik, to W.N.W. throughout.

The Bols (or larger) Kinel, upper course to W.N.W., lower to S.W.

The Surgush, upper course to S.W., lower to N.W.

The Nitchegui, upper course to N.W., lower to S.W.

The Buguruzlan and Savrush, to S.S.W. throughout.

The Sok, upper course to W.N.W., lower to S.W.

The Siczjaia, to N. throughout.

The angle of inclination of this declivity has never been determined, but from the fact that its rivers rise nearly at the same elevation as the rivers of the preceding declivity, and that their mouths have a much lower elevation than these latter rivers, it appears to follow that the angle must be considerable.

The local forms are the same as those which prevail in the preceding declivity. There is much less wood; it is indeed in a great measure confined to the space between the Buguruzlan and the upper valley of the Surgush. There also steep declivities are found on the right sides of the valleys of the principal rivers, and the gentle slopes on the left: the arrangement, however, is less regular in the valleys of the affluents. In the S.E. part of the W. declivity the steep declivities occur most frequently, and their height is greater. The valleys are generally wide, especially those to the N. and to the W.

The S.E. declivity is of inconsiderable extent. It lies between the S. descent of the E. termination of the principal crest and the E. descent of the second branch. It is occupied by the valleys of—



The two Tchebenkas, flowing to the S.

The Abdulorka to the S.S.W.

The great and little Kurgaz, upper course to S., lower to W.

The Salmj to S.S.W.

The Yanghisa to S.S.W.

The three Kargalkas to S.S.W.

The formation is exactly similar to that of the preceding declivities.

The southern declivity of the plateau is the descent of the third branch. Its greatest breadth is 80 versts; and the space is occupied by the valleys of these rivers:—

The Kindel, flowing to S.W.

The Irtetz to S.W.

The Elatishevka to S.

The Embalatovka to S.S.W.

The Bykovka to S.S.W.

The Rubejnaya to S.

The Tchegan to S.S.W.

The two Tchijes to S.

The upper valleys of the two Uzens to S.S.W.

The only difference between the local forms of this and the preceding declivities arises from its being more furrowed with valleys and ravines.

### III. THE WESTERN DEPRESSED VALLEY.

The valley of the Bielaya separates the W. advanced range or outlying plateau from the central mountainous region, and also from the N.W. advanced range. Between where the direction of the river changes from S. to W. and the bend where it turns to the N.W., the mean breadth of the valley is about 5 versts. The space between the bed of the river and the syrts and heights which bound the valley is a low terrace, which at its descent to the river forms banks, which are high only in a few places and nowhere steep. Below the bend to the N.W. the valley widens to 15 versts. The river has in this part a winding course, with long reaches and obtuse curves. The margin of the river in many places marshy. Low heights rise from the N. and W. borders of the morass. At the mouth of the river the level bottom of the valley extends from the right bank of the Ik to the left bank of the Berezovka.

### IV. THE NORTH-WESTERN ADVANCED RANGE.

The north-western advanced range of the Orenburg Ural is the southern termination of the plateau which rises between the Ufa, Kama, and Bielaya. The direction of its depression is towards the S.W. Three principal crests furrow its surface, dividing the valleys of the rivers Buñ, Tanyp, Bir, and Ufa.

They form two terrace-slopes, divided by a line drawn from the upper valley of the Ghirei, the mouth of the Uvarza, the sources of the Kinghir, the bend where the Bira turns to N.N.W., the upper valley of the Iziak, and the valley of the stream Shugorovka.

The E. or upper terrace-slope is divided into two parts by the crest which extends between the Tanyp and Bir. To the N. of the crest the terrace-slope sinks in the direction of S.W. and contains the following fluvial valleys:—The upper valley of the Tanyp, which flows to S.W.; the valley of the Yüg to S.S.W.; of the Tushkur to W.N.W.; of the Aziak to N.; of the Kighan to W.N.W.; of the Karish to N.; of the Ar, to N.W. The part which lies S. of the crest has the following fluvial valleys:—The valley of the Tuy, flowing to S.S.E.; of the Baika, in its upper course to N.E., and in its lower to S.E.; of the Urgush to S.; of the Uriuk to S.; of the Usa to S.; of the Iziak to S.; the upper valley of the Bir to S.S.W.; and the valley of the Iniak to S.

The general inclination of the W. or lower terrace-slope is to the S.W. It is divided by the two principal crests which bound the valley of the Tanyp, and contains these fluvial valleys:—That of the Buï, flowing to the W.S.W.; of the Amza to N.W.; of the Aybak to S.; of the Ghirei to S.S.W.; of the Uvarza to S.S.W.; the lower valley of the Tanyp to S.W.; of the valley of the Uï to N.; of the Sivergan to N.; of the Sulza to N.N.W.; of the Talta to W. This terrace-slope terminates in the lower valley of the Bielaya.

The local forms of the N.W. advanced range of the Orenburg Ural are the same as those of the W. advanced range. In the E. part of the north-western advanced range the terraces are more numerous than in the western: they are also on a larger scale, and their slopes are more steep. This is the case to a remarkable degree along the crest which forms the watershed. Here the valleys are narrow, deep, and bounded by steep acclivities. To the west the valleys are wide, and steep acclivities unfrequent. The valleys throughout the range have the steep acclivities on the right banks of their rivers, and the gentle slopes on the left.

The whole of this advanced range is well wooded. Its elevation has never been determined.

#### V. THE SOUTH-EASTERN ADVANCED RANGE.

The south-eastern advanced range of the Orenburg Ural is the plateau which is situated between the E. and S. borders of the mountainous region; the S. extremity of the W. advanced range, the upper valleys of the Karaktchil, Tolpak, and the Kaldatchida, the mouth of the Atche-Uyil, the bend where

the Saghiz turns to the S.W., the bend where the Emba turns to the W., the termination of the Tchagan, the Ust-urt, the upper valleys of the Jandysaj, Kunjur, Irghiz, and Tobol, the mouth of the Jilkuar, the confluence of the three Ayats, the valleys of the Kisene-taïuzuk and the Tash-atkan, and the mouth of the Tchernaya.

The central mass of this plateau lies between the upper valley of the rivers Tobol, Or, Irghiz, Chagan, Emba, and Ilek. It is bounded by four principal terrace-slopes, which sink down in the respective directions of N.N.E., S.S.E., S.W., and N.N.W. Between the E. verge of the plateau and the terrace-slope towards the N.N.E. there is a fifth of less consequence, the declivity of which has an easterly direction. The line along which the meeting of these declivities forms a watershed, in other words, the axis of greatest elevation, extends from N. to S. 700 versts in a straight line: its northern termination rests on the range of steppe-syrts between the upper valleys of the Uï and Üral; and its southern termination on the Ust-urt.

The southern part of this region, from the Ust-urt to the Or, is known by the name of the Mugodjar mountains. They have the appearance of a sharp-backed irregular ridge, with many peaks, the most remarkable of which is called Aïruk. Traces of violent igneous action are everywhere met with; the soil on the declivities is barren; and as the traveller advances southward the salt marshes become more numerous. Small hills, covered with these salt marshes, are the characteristic features of the country, where the advanced declivities of the Mugodjar mountains unite with the Ust-urt. Frondous trees grow in the deep narrow ravines. Springs abound, but their water has generally a chalybeate taste. Copper ore abounds throughout the ridge. Towards the N. the crest of the ridge is flatter; the peaks diminish in size, and occur less frequently. At the sources of the Jilkuar it assumes the characteristics of a broad flat-backed syrt: it is there called the Karauba.

A second ridge extends S.W. from the plateau to the sources of the Emba, the upper valleys of the Utva, the Talpak, and the Karaktchil. Few eminences rise above the average level of the ridge to the S.W., and to the N.W. it becomes an almost imperceptible syrt.

A third ridge extends eastward from the upper valley of the Irghiz to the bend where the Ishim turns to the N. It has never been explored.

The local forms in this part of the S.E. advanced range are, low valleys in which sandy soil alternates with salt marshes, gentle declivities, steep terrace-slopes, steppe-syrts, both dome-shaped and flat-backed, and small stony peaks.



The valleys are almost everywhere wide and open; the sandy bottoms predominate to the N., the salt marshes to the S. With the exception of the inconsiderable fir-forest Jabyk-karaia, situated between the upper valleys of the Tauguzak, Ayak, and Sarym-Sakla, there is no wood either in the valleys or on the syrts.

The W. declivity of the plateau comprehends the valleys of Gumbeyka, which flows in its upper course to the S., in its lower to the S.W.; the Sarym-Sakla to the W.; the Kart to the W.; the Kars to the W.N.W.; the Suvanduk, in its upper course to the S.S.W., in its lower to the S.; the Jarla-butuk, in its upper course to the S.W., in its lower course (under the names Kumuk and Erakla) to the W. The upper valleys of these rivers are open, with gentle declivities, their lower valleys ravine-shaped, with steep terrace-slopes.

The N.E. declivity of the S.E. advanced range, or outlying plateau, forms the W. side of the upper basin of the Tobol. The S. part of this declivity is yet unexplored; the N. part contains the valleys of the Chertanda, which flows to the N.E.; the Jilkuar, in its upper course to the N.E., in its lower to the E.; the three Ayats to the N.E. and E.; the upper course of the Tauguzak to the N.E. Steep terrace-slopes predominate along the Kamyshyla-Ayat, in the lower valleys of the Jilkuar, Tchertanda, and along the Tobol, between the mouths of the Jilkuar and the Ayat. The N.E. part of this declivity terminates in a low valley filled with lakes.

The upper valleys of the following rivers constitute the S. part of the S.W. declivity:—The Mana and the Tchagan, which flow in this part of their course to the S.W.; the Emba to the S.W.; the Saghiz to the W.; the Atche-Uyil to the W.N.W.; the Uyil to the W.N.W.; the Tchicla to the S.; these insignificant steppe-brooks, the Karasa, Kaldatchita, Buldirta, Tolpak, Koperla, Akkata, and Kirakshiik. The southern part of this declivity is broken and hilly; the northern less rugged. Extensive sands and salt marshes are numerous. The most remarkable sands in the valley of the Emba, Jurgan-kum, Ak-kum, Saghiz; in the valley of the Uyil, Barkin, and Taïsuggan.

On the N.W. declivity are the valleys of the Or, which flows to the N., the Kizil-kaik to the N., the Ilek to the N.W., the great Khobda to the N.W., and the Utva to the N.W. The right banks of these rivers are in general steep, the left gently undulating. The local forms here are the same as those of the S. declivity of the S.W. advanced range. The considerable rocky heights are confined to the valleys of the Or and Ilek.

## VI. THE NORTH-EASTERN DEPRESSED VALLEY.

A low plain lies between the Ilmen hills and the N. border of the W. advanced range. It comprehends the E. portion of the valleys of the Uï and Miass. There are three terrace-slopes in it. The first, or upper terrace-slope, extends from the E. declivity of the Ilmen hills to a line drawn across the mouths of the Uziu and the Kabanka. The plateau formation prevails within these limits. It is drained by two principal water-courses: the valley of the Uvelka, which flows to the S.E., and the valley of the Miass, which flows at first to the S.S.E., and afterwards to the N.E. The second terrace-slope extends from the line across the mouths of the Uziu and Kabanka to the sources of the Tchernaya, Kotcherdyk, Kurtamysh, Yurmysh, and Ik. It is only intersected by the Tchumliak, an affluent of the Miass, and presents the appearance of a plain, overgrown with pines and dotted with lakes, which have low flat margins. Some of these lakes are from 20 to 30 versts in circumference, but the greater number are drying up and leaving in their place marshes, impregnated in some places with salt. The third terrace-slope declines towards the left bank of the Tobol. It is dotted with lakes and intersected by some insignificant streams. The portions of the valleys of the Tobol, Uï, and Miass, which intersect this depression, are wide and level.

## VII. THE SOUTHERN DEPRESSED VALLEY.

The second depression is bounded by the W. border of the S.E. advanced range, the S. termination of the W. advanced range, and the elevated ground which runs S.S.W. from the sources of the Yaruslan, and may be regarded as a prolongation of the third branch of the Obtechei syrt. The elevation of this tract is in some places imperceptible to the eye, in others it is indicated by small clusters of peaks.

The most remarkable are, Yaman-tau, at the sources of the Yaruslan; the little Bogdo, near the northern border of the elevation; the great Bogdo, Tchaptchaptchi, Arzagar or Bish-tchok. The little Bogdo has the shape of a great mound with two cliffs. It is upwards of 2 versts in circumference and 20 sashins in height. It is composed of a reddish-yellow clay, compact limestone, and small fossil shells.\* The great Bogdo is a considerable isolated hill. The N. and E. sides are almost perpendicular, and their ascent difficult and dangerous. The other sides, particularly the western, have a very gentle declivity, which loses itself insensibly in the steppe. The

\* These and all the fossiliferous deposits of the S. Ural are described in the forthcoming work, "Russia and the Ural Mountains."

surface of the mountain is covered with small stones. Large fragments of stone encumber the N.E. side of the mountain. The action of the rains and melted snow has excavated hollows at the base of the hill. A great number of salt springs rise on the N. declivity, and run into the lake Baskuntchatskoï, the waters of which are sufficiently impregnated with the muriate of soda to admit of salt being prepared from them by evaporation. The only freshwater spring on the great Bogdo occurs at a much greater elevation than the rest; its waters have a slight admixture of oxyde of iron. The Tchapehaptchi is about 6 versts in circumference, and about 30 sagues high. Its surface consists of a mixture of clay and fossil shells; the interior of sandstone and shale. Several deep ravines divide it in a manner into several hills. Strata of rock-salt, of the same kind as that found at Ilek, have been found in the ravines at a considerable depth. The ten long, steep, white pinnacles of Arzagar give the hill the appearance of an immense town, when seen from a distance. For this reason it is sometimes called Ak-kal'eh (white fortress) by the nomade tribes. A nearer approach shows deep cliffs and ravines, among which are scattered heaps of blocks of limestone and gypsum. In addition to these hills the following deserve notice:—Yaman-bish-tau, Yakshi-bish-tau, and the Kumalik. The former two are composed of a sandy and argillaceous earth, mixed with fossil shells.

The remainder of this depression is a flat plain slightly inclined to the S. In a few places small hills give an undulating appearance to the surface, but uneven tracts of sand, salt marshes, or a steppe with a sandy and argillaceous soil, on which there is no vegetation except in a few places some reeds and grass on the banks and at the mouths of the streams, prevail.

The southern depression may be divided into several parts, in each of which a peculiar local form predominates. 1. The best and most fertile part of the plain occurs in the lower valley of the Ural. The fertile part of the valley varies in breadth from 5 to 15 versts. It is for the most part a dead flat, and abounds in natural grasses and brushwood. 2. The space occupied by the valleys of the steppe-streams, which descend from the Obtecheï syrt, and lose themselves in the steppe, is bounded by the river Ural, the Kamysh-samary lake, and the right bank of the little Uzen. The surface presents either undulating meadows as on the Divra and the Tchiye, or groups of lakes as in the vicinity of the two Uzens and the Kushum. The banks of these rivers are steep, but a level plain extends on both sides of them. They lose them-



selves in two chains of lakes known by the name of Kamysh-samary, which are choked up with reeds, and divided by the undulations of a plain called "the Mauc," over whose surface salt marshes alternate with low hills of mixed sand and clay, covered with grass and brushwood. 3. Between the lower valley of the great Uzen and the hills Yakshi-tau, Bogdo, and Yaman-tau, is a tract of salt marshes and muddy bottoms, impregnated with salt. The marshes (called Katmas occur most frequently on the E. side of the tract. The largest are, Aral-sor, Jaik, Tsyndyk, Kobdak-sor, Bikbaula, Bish-tau, Tubak, Tungusha, Tuguriuk, Shalamanof, and Turke. In the rainy season they become pools, but during the dry season they become hard and firm, and are even overgrown with wormwood (*absinthum*). The muddy bottoms, impregnated with salt (or khaks), occur in the W. part of this tract. The largest muddy bottoms, impregnated with salt, are Aral-sor (in which the Gorkaya loses itself), Krypuba, Karabai, Aral-tiubia, Yanka, Jenbulak, Katmas, Shirgazy-sor, and Tchulak-kupa. Many are simply called khaks without any distinctive name. These nameless ones are filled with water during the spring rains to the depth of an arshin; but during the summer-heats the water is dried up, leaving only a saline argillaceous mud covered with a thick coating of bitter salt in the centre. The mud is so soft that it is dangerous, if not impossible, to pass over it. The larger khaks, with distinctive appellations, are situated between the W. border of the sandy tract, called Ryn, and the lake Baskuntchatskoi. They occupy a space of 20 versts in length, and about as many in breadth. Many of them have perennial pools, and do not freeze in winter. 4. Between the prolongation of the third branch of the Obtehei syrt, the lake Kamysh-samary, the valley of the Ural, and the shore of the Caspian is a tract of sandy hills, among which are scattered salt marshes. The most remarkable part of this space is the tract 150 versts in length, and varying from 30 to 40 in breadth, which lies between the E. border of the khaks and the lake Kamysh-samary, known by the name of the Ryn sands. It is composed of a great many irregular plains, each of which might measure from 2 to 5 square versts, divided by long narrow heights of moveable sand. The soil of these plains is sandy, but covered with the herb rjanetz, and other kinds of soft high grasses. Excellent water is everywhere found, at the depth of from 1 to 3½ feet. There are 12 divisions of the Ryn sands, which, taking them in order from W. to E., are designated as follows:—Jaskuss; Kandy-agach; Metchet; kum; Kizil-khaly; Jangheldy; Jusí; Tialybai; Terekly-Aighir-kum; Bartcha-kum; Yaman-kum; and Ery-kum.

The highest sand ridges are in the division Ayghir-kum, where they attain the height of 10 sagues. There were thick woods in the Ryn sands at so recent a period as the beginning of the present century, of which only a few remnants are now to be seen in the divisions Metchet-kum and Kandy-agatch. The trees are *Rakita* (a species of *Cytisus*); *Pal Ozokor* (the black poplar); with the shrubs *Tchernopol*, *Tanalga*, *Yuzgun*, *Krushika*, and *Yeda* (thorns, crab-apples, sweet briar, &c.) Sandy heights and salt marshes extend to the S. of the Ryn sands, but the fresh water found there is inferior in quality, and is only found by digging much deeper. 5. The portion of the depression which lies E. of the valley of the Ural must be viewed as consisting of two parts. To the N. are the basin of lake Talkar, the valley of the Taïpak, and the tract called Jaôr-kamysh; the S. part is intersected by the valleys of the Uyil, Karabaïa, Janghildy, Saghiz, Kaïmara, and Emba. The northern part, a slightly undulated steppe, is the more fertile; the southern part is hilly, sandy, and has a few salt marshes and a great number of muddy bottoms, impregnated with salt. The most remarkable sands occur in the valleys of the Uyil, Karabaïa, Janghildy, and, under the name Taïsugan, on the right side of the valley of the Emba. These tracts are separated by an elevated range, which extends from the upper valleys of the Baldirta and Kaldatchilta to the margin of the lake Inderskoy, in the valley of the Ural.

The north shore of the Caspian, which forms the boundary of this plain, is low, indented with small bays, and encompassed by a chain of islands.

The elevations of the S. depression have been measured only in its W. parts, barometrically by Helmersen and Göbel, trigonometrically by Sawitch and Sabler. Their observations give the following results:—

	Parisian feet.
Hills :— Arzagar (Göbel)	266
Tchaptchaptchi (ib.)	117
Bogdo (ib.)	546*
Plain :— Base of the Arzagar (Göbel)	58
Steppe between the Arzagar and Tchaptchaptchi (ib.)	— 14
Base of the Tchaptchaptchi (ib.)	37
Steppe between the Tchaptchaptchi and Bogdo (ib.)	42
Lake Elton (Göbel)	— 18
„ Baskuntchatskoï (Göbel)	4
Village Kotchetaïevka (ib.)	— 41
Level of the Caspian (Sawitch and Sabler)	— 75·6

\* 103 toises above Caspian.

## ANALYSES.

I.—*Resúmen de la Geografía de Venezuela.* Por AUGUSTIN CODAZZI. Formado sobre el mismo plan que el de Balbi y según los conocimientos prácticos adquiridos por el autor en el curso de la comision corográfica que puso á su cargo el Gobierno de Venezuela. Paris: Imprenta de H. Fournier y Compania, Calle de St. Benoit, No. 7. 1841.

THE author of this work, Don Augustin Codazzi, collected its materials while member of a geographical commission appointed by the government of Venezuela, in which the labouring oar devolved upon him. The descriptive geography consists mainly of facts extracted from the writings of Señor Feliciano Montenegro de Colon, and from a work entitled 'Colombian Geography.' In tracing the boundary, 'El Derrotero Español' has been followed. The political geography relates to the old and to the present divisions of the territory: the former are taken from Humboldt and Depons; the latter from official documents. Balbi has been followed for the ethnography. The physical geography is what the author claims as especially his own; admitting, however, his obligations for the classification of plants to the work of Don Ramon de Sagra, and to communications from private individuals, whose assistance is duly acknowledged; for the classification of animals, to the writings of Roulin, Berthelot, and the work entitled 'The Mexican Museum' ('El Museo Mejicano'). In the account of cultivated vegetables, Depons has been followed. The conformation of the coast is given from 'El Derrotero Español.' The work was submitted, after it had been completed, to the revision of Señores Rafael Maria Barall and Ramon Diaz: the commandant of engineers, Juan Manuel Cagigal, had been previously consulted as to its plan and distribution, and expressed his approbation of those which the author had sketched out.

This retrospect of the sources from which the 'Resúmen de la Geografía de Venezuela' has been compiled, and of the way in which the author set about its construction, assists us in forming an estimate of the positive amount of additional knowledge likely to be conveyed by it to the geographer. It presents us with a more complete and systematic account of the territory of Venezuela than we before possessed, or than we yet possess of any other territory



occupied by the Spanish race in the New World. It condenses within an easily accessible compass the valuable information scattered through the works of Humboldt, Sagra, Montenegro de Colon, and the '*Derrotero Español*.' These materials are pieced out by supplementary information from Balbi and the '*Geografía de Venezuela*,' which, as at least second-hand, or resting upon anonymous authority, are of very inferior value. Here and there are scattered pieces of original information, not to be found elsewhere, from natives and residents of the Venezuelan territory, the exact amount and importance of which it is difficult for any one who has not himself perused the book to estimate. The information respecting the actually existing territorial divisions and names of places, and respecting the numbers and distribution of the races at present occupying the soil, is that portion of the contents of the work which possesses most of novelty. Being collected from official documents, it may also be regarded as adding to its character of novelty high claims to that of authenticity. The execution of the work is of a nature to lead to a high estimate of the author's powers of observation, classification, and artistical finish. Taking all in all, it is a national geography of which no country need be ashamed, and which is eminently creditable to a state in which settled government has been so recently re-established, after a long revolutionary period, following one during which the intellectual development of the inhabitants was, to say the least, not encouraged by the mother-country.

The political limits assigned by Codazzi to Venezuela, until we come to where that state is coterminous with British Guiana, do not differ materially from those laid down in the map of Colombia published by Mr. Arrowsmith and dedicated to Colonel Wilson. There are, however, indications in the description of the direction of the frontier-line, of opinions respecting the position of sources and the direction of the courses of some of the streams, at variance with what we learn from that map, or indeed any other that has been published. Some more full account of these new readings (if the phrase be admissible), and of the authority upon which they have been adopted, than was compatible with the nature and plan of the work now under review, is desirable.

The difference between the frontier claimed by the Venezuelan and that claimed by our own government, only affects the extent assigned by Codazzi to the province of Guayana. When that controversy comes to be finally settled, the Venezuelan province of Guayana will in all probability be found to be of much less superficial extent than it is said to be in the '*Resúmen*.' A change in the statement of its area (and that is in a great measure conjectural) will, however, be all the alteration rendered necessary; for concerning that portion which may fall within the British frontier,

the 'Resúmen' gives no information. The only satisfactory account of it is to be found in the Chevalier Schomburgk's journals.

The territory of the Venezuelan republic is, according to Codazzi, divided into thirteen provinces. The following table is a useful contribution to comparative geography, as showing the population of the chief towns of each province, and the date of the erection of each into the capital of a province, thus presenting at one view the different subdivisions of this territory since 1520, and enabling us to form an estimate of the actual progress of the settlement of the country:—

TABLE showing the comparative Population of the Provincial Capitals, the Date of the foundation of each, and of its erection into a seat of provincial government.

Name.	Population.	Date of Foundation.	Date of Erection.
Carácas . . . . .	35,000	1567	1578
Valencia . . . . .	16,000	1555	1824
Barquisimeto . . . . .	12,000	1552	1830
Coro . . . . .	4,000	1527	1815
Maracaibo . . . . .	14,000	1571	1678
Trujillo . . . . .	4,000	1559	1811
Mérida . . . . .	6,000	1558	1811
Barinas . . . . .	4,000	1576	1787
Achaguas . . . . .	2,000	1774	1823
Barcelona . . . . .	6,000	1637	1811
Cumana . . . . .	8,000	1520	1521
Margarita . . . . .	3,000	1525	1811
Angostura . . . . .	4,000	1576	1768

With the exception of three, the provinces have the same names as their capitals. The exceptions are—the province of Carabobo, of which Valencia is the chief town; that of Apure, in which Achaguas is the seat of the provincial government; and Guayana, of which Angostura is the capital.

The reader will be able, from the names of the capitals, to trace the relative positions of the provinces on the map. As the names of the cantons into which each province is divided have not yet found their way into our maps, it may not be useless or uninteresting to add here the estimated extent and cantonal division of each province:—

*Carácas.*—This province extends from 7° 38' to 10° 40' N. lat.; and from 2° 8' E. of the town of Carácas to 57' W. It had 242,888 inhabitants (about 85·4 to the square league) in 1841. The cantons are—Carácas, La Guaira, Petave, Guarénas,

Caucagua, Río Chico, Santa Lucía, Ocumare, La Victoria, Turmero, Maracai, Cura, San Sebastián, Orituco, Chaguaramas, Calabozo.

*Carabobo*.—This province lies between  $8^{\circ} 14'$  and  $10^{\circ} 55'$  N. lat.; and between  $45'$  and  $1^{\circ} 48'$  W. of the meridian of Carácas. The population in 1841 was 96,967, which was estimated at about 1.45 to the square league. The cantons are—Valencia, Puerto Cabello, Ocumare, Nirgua, Montalban, San Carlos, El Pao.

*Barquisimeto*.—This province extends from  $8^{\circ} 47'$  to  $10^{\circ} 46'$  N. lat.; and from  $1^{\circ} 25'$  to  $3^{\circ} 25'$  W. of Carácas. Its population amounted in 1841 to 112,755, giving 144 to every square league. The cantons are—Barquisimeto, Quibor, Tocuyo, Carora, San Felipe, Yaritagua.

*Coro*.—This province lies between  $10^{\circ} 5'$  and  $12^{\circ} 9' 50''$  N. lat.; and between  $1^{\circ} 18'$  and  $4^{\circ} 22'$  W. of Carácas. The population in 1841 was 40,476 souls; about 43 inhabitants to the square league. The cantons are—Coro, Paraguaná, San Luis, Cumarebo, Costa Arriba, and Casigua.

*Maracaibo*.—This province lies between  $8^{\circ} 12' 30''$  and  $12^{\circ} 16'$  N. lat.; and between  $30^{\circ} 14'$  and  $6^{\circ} 13'$  W. of Carácas. It contained, in 1841, 27,800 inhabitants, estimated at 15 to the square league. The cantons are—Maracaibo, Alta Gracia, Perija, Gibraltar, and Zulía.

*Trujillo*.—This province lies between  $8^{\circ} 28'$  and  $9^{\circ} 42'$  N. lat.; and between  $2^{\circ} 39'$  and  $3^{\circ} 41'$  W. of Carácas. It contained, in 1841, 44,788 inhabitants, estimated at 123.7 to the square league. The cantons are—Trujillo, Boconó, Carache, Escuque.

*Mérida*.—This province extends from  $7^{\circ}$  to  $8^{\circ} 51'$  N. lat.; and from  $3^{\circ} 4'$  to  $5^{\circ} 39'$  W. of Carácas. In 1841 it had 62,116 inhabitants, or about 68.4 to the square league. The cantons are—Mérida, Mucuchies, El Egido, Bailadores, La Grita, San Cristóbal, San Antonio.

*Barinas*.—This province extends from  $6^{\circ} 46'$  to  $9^{\circ} 37'$  N. lat.; and from  $56' 30''$  to  $4^{\circ} 50' 30''$  W. of Carácas. In 1841 it had 109,497 inhabitants, or about 54.9 to the square league. The cantons are—Barinas, Obispo, Guanare, Ospino, Araure, Pedraza, Nutrias, Guanarito.

*Apure*.—This province extends from  $5^{\circ} 33'$  to  $7^{\circ} 55'$  N. lat.; and from  $17'$  E to  $5^{\circ} 9'$  W. of the meridian of Carácas. The population in 1841 amounted to 15,479 individuals (among whom were 2,920 of subdued, and 2,375 of independent Indians), giving about 8.5 to the square league. The cantons are—Achaguas, San Fernando, Mantecal, and Guasqualito.

*Barcelona*.—This province extends from  $7^{\circ} 48'$  to  $10^{\circ} 20'$  N. lat.; and from  $1^{\circ} 15'$  to  $5^{\circ} 54'$  E. of Carácas. It had in 1841 a population of 52,103 souls, or about 45.1 to every square



league. The cantons are—Barcelona, Píritu, Onoto, Aragua, San Mateo, San Diego, El Pao, Soledad.

*Cumaná*.—This province extends from  $8^{\circ} 9'$  to  $10^{\circ} 44'$  N. lat.; and from  $2^{\circ} 54'$  to  $5^{\circ} 12'$  E. of Carácas. The population in 1841 was 50,671 individuals, or about 54·6 to the square league. The cantons are—Cumaná, Cumanacoa, Cariaco, Carúpano, Río-Caribe, Güiria, Aragua, Maturín, Los Caños.

*Margarita*.—This province extends from  $10^{\circ} 51' 30''$  to  $11^{\circ} 9' 45''$  N. lat.; and from  $2^{\circ} 40'$  to  $3^{\circ} 9' 15''$  E. of Carácas. In 1841, it had 18,305 inhabitants, or about 494·7 to the square league. The cantons are—Asuncion and El Norte.

*Guayana*.—This province extends (according to Codazzi) from  $1^{\circ} 8'$  to  $10^{\circ} 2'$  N. lat.; and from  $2^{\circ} 9'$  to  $8^{\circ} 45'$  E. of Carácas. Even after making allowances for the excessive estimate resulting from carrying the frontier a good way into the British territory, this province must, in superficial extent, be about equal to all the other provinces of the republic taken together. It is very thinly inhabited, and chiefly by roving, or half-settled, tribes of Indians, of whom a majority inhabit the portion of the territory claimed by the British. Codazzi estimates the total inhabitants within the limits he assigns to the province of Guayana at 20,149 (of whom 16,000 are independent Indians), or about 2·2 individuals to the square league. The cantons are—Angostura, Bajo Orinoco (or Picoa, from the chief town), Upata, Coicara, and Río Negro (or San Fernando de Atabapo).

The population of Venezuela, from documents in the government archives, appeared in 1839 to amount to 945,348. In 1800 it was estimated at 780,000. At the commencement of the Venezuelan revolution it had risen to about 800,000. This gives, from the commencement of the revolution to 1839, or during a period of 36 years, an annual increase of only ·028 per cent. The number of negro slaves when the revolution broke out was 62,000; in 1839 it was 49,000. When we consider that more than one half of the slaves are understood to have gained their liberty by joining the ranks of the revolutionary army, and that considerable numbers were dispersed and lost sight of during the wars, the present number indicates an increase upon the remainder so disproportionate to the progress of the other classes of the population, as almost to warrant the suspicion of the introduction of some slaves into the territory of the republic from without. The Spanish Americans at the time of the revolution were estimated at 200,000, and the Europeans at 12,000; the Spanish Americans, and other Europeans, in 1839, at 260,000. The free mulattoes, and other mixed races, were estimated at the time of the revolution at 414,151; in 1839, at 406,000. At the former period 120,000 of the inhabitants are described as Indians of unmixed race; in 1839

there are said to have been 52,415 independent Indians; 14,000 subjugated Indians of unmixed race; and 155,000 subjugated Indians, of blood more or less mixed.

II.—*Précis de Géographie élémentaire.* Par Paul le Chaix, Membre de la Société Royale de Géographie de Londres, et de la Société de Physique de Genève, Ouvrage adapté au Collège de Genève. Genève, 1843.

*Elémens de Géographie Générale; ou description abrégée de la terre d'après ses divisions politiques coordonnées avec ses grandes divisions naturelles, selon les dernières transactions et les découvertes les plus récentes.* Par Adrien Balbi. Paris, 1843.

THE perusal of these two works—both by able geographers—one, indeed, by a Nestor of geography, the worthy successor of Malte Brun—among other good effects is adapted to set the reader to ask himself—What is geography?

There are branches of science the object of which is so precisely defined, that it is at once seen whether a question or investigation belongs to it or not. Of this class are geometry, which restricts itself to the measurement and comparison of magnitudes; chemistry, which confines itself to the analysis of the constituent atoms or elements of bodies; and so on. But geography, statistics, and such other branches of science as have had their forms and limits originally impressed upon, not from the unity of their subject and its completeness within itself, but from the wants of practical men, who require information respecting a certain number of cognate topics, run into each other (if the expression be allowable), so that it is sometimes difficult to say to which of them a subject belongs.

With respect to geography, for example, it is much more easy to say what it is not, than what it is. It is not geology, and it is not geognosy, though the geographer is required to be pretty familiar with the results at least of these sciences, and results can never be correctly apprehended without a general notion of the processes of thought and observation by which they are attained. In like manner, it is not meteorology, the study of the laws of motion, as illustrated in the oceanic tides and currents; nor botany, though of all of these sciences the geographer requires to have correct notions. Still less is geography the study of antiquities or statistics, although the world—and the world as a fit habitation for man—being the great object of the geographer's inquiry, he cannot avoid casting a look at the facts of the latter; and it is often by combinations of the former, and inferences drawn from these combinations, that he must arrive at the knowledge of facts which lie within his proper domain.

For the geographer of mature years this difficulty of defining the exact boundaries of geographical science is of comparatively little practical importance. The best and most intelligent geographers are continually overstepping their own limits—running off into irrelevant disquisitions—carefully cataloguing facts which only serve to obscure the main object of their inquiries; but their own judgment, and the criticisms of their collaborateurs, always brings them back. These discursive habits—this tendency to overload their subject—is a propensity not always to be discouraged. It is at least indicative of an energy and richness of thought that is more to be desired than that barrenness of mind which, from sheer want of the ability to strike out original trains of investigation, never deviates from the path.

It is in elementary works that the want of precise notions respecting the scope and tendency of geography is most hurtful. No school or college tuition—no teaching of any kind—can make a man of science. The utmost teachers can do is to put their pupils on the road, which they must travel by their own exertions. The acquisition of science is the work of a life, and it must be acquired by self-exertion, or not at all. The business of the teacher is to impress upon the learner's mind the nature and aim of the particular branch of science to which he is introduced, and to supply him with some of the most approved useful methods for pursuing his investigation. The first of these objects can be best attained by presenting to the pupil a sketch of the results of the science in its actual state of advancement. Definitions are of little use to tyros except to bewilder them, or flatter them with an illusive notion that they have learned something. They are empty forms, strengthening to those intellects into which the substance of knowledge has already been conveyed, but dry husks to those who have not already acquired a fund of experience to fill them up with.

Let the teacher lay hold on the imagination of his pupil, by rapidly placing before him the forms and features of the earth in its different regions—as he himself believes they appear. Let him next direct his attention to the circumstance of how small a portion of the earth any one individual can know from personal observation. This will naturally lead to the inquiry how this limited personal experience is to be eked out by information from others; and to the importance of that acquaintance with the laws of evidence that teach to discriminate true from false or inaccurate information. In the process of communicating this information opportunity may be taken to impress, by illustration, the importance of neatness and precision of expression, and to show the value of technical language—of fixed and unvarying names to designate the most frequently recurring forms of earth and ocean—



when not pedantically used. The proper names of regions, districts, and localities, will be most easily retained in the memory after some explanation has been given of their origin and meaning. And this, it would seem, is the fittest time to direct attention to the advantage which a general notion of the structure and combination of states, in order to appreciate the influence of political relations in leading certain portions of the earth to be regarded as its integral units. The value of geography as a key to history, and the light which history again reflects on geography, might here be explained; as well as the necessity of paying attention to the changes produced on the earth's surface by human agency, in order to distinguish between what is natural in the appearance of a district, and what the result of the operations of art—the only means of escaping error in endeavouring to ascertain the original characteristic forms of the earth's surface. Such a method of tuition would have the double recommendation of being at once the most easy and attractive; of impressing ineffaceably on the pupil's recollection the distinction between the essentials of geographical knowledge and those subordinate inquiries into which the geographer is required to enter extensively, though only the results of his investigations ought to be entered into the register of his science.

This is no Utopian or fanciful sketch: it is almost a literal transcript of what has been done by one who has given a greater impetus perhaps to geographical science than any other person in an age distinguished by the great amount of intelligence, energy, and enterprise, that has been devoted to this pursuit. Those who make their estimate of how much Professor Ritter has done to promote geographical science from his published works vastly underrate his influence. His *Asia*, of which the eleventh volume, of considerably more than a thousand pretty closely-printed octavo pages, has just appeared, notwithstanding the value of its contents, the general justice of its views, and the careful *critique* which pervades it, is and must remain a work in which the author has only partially succeeded. It is, properly speaking, neither a compendious history of geographical discovery, nor a system of geography, but an attempt to combine the irreconcilable attributes and uses of both. It is a book that would seem to require almost a lifetime to read, to say nothing of writing it. It is indeed "*die Erd-kunde im Verhältniss zu der Natur*"—a picture of the world large as life. It is the collected "*studies*," to borrow a phrase as from the *atelier* of the painter, for a great work, rather than the work itself artistically completed. The learned and able author will be cheated out of more than half his fame in consequence of this mistake. His book will continue to be a rich field whence inferior men may plunder, almost without risk of detection, the

fragments of learning in which they array themselves. It cannot tell, as the value of its contents ought to make it tell, on the mass even of reading and reflecting persons. It is by his occasional writings, and, still more, by his academical lectures, that Ritter has given to geography a new impulse, and a new form.

He has rightly seen that in order to know the world aright we must familiarize ourselves in the first place with its special features, and by combining them attain to a notion of the whole. He has therefore made topography the basis of his system, the portal through which he enters the domain of geography. His groundwork is a description of the forms of a particular district, and their combination and relations to each other. After passing in review a number of such districts, by a farther comparison of them with each other as larger units, he enables himself to generalize his views of the forms assumed by the globe's surface. And thus in succession he arrives at generalized views of the forms and relations of the great divisions of the world--of the world itself. A new and more correct technical language for geography has been one result of this process. Another has been a more distinct separation of the essentials, the main object of geographical inquiry, from subordinate details and auxiliary inquiries. Professor Ritter has thought it for the best to combine ethnological with geographical science. But though he pushes on his investigations in these two distinct branches of knowledge *pari passu* (making local distribution his clue in tracing the labyrinthine perplexities of an inquiry into the origin and relations of the human race), he nowhere confounds them. Ethnography is made to supply hints whence the structure of unexplored or partially explored regions may be inferred; geography is made available to notice the migrations of tribes and families, or to show the possibility of their connection, but there is no danger of mistaking the one science for the other. And throughout the writings of Professor Ritter the methods of geographical inquiry--the formulas by which the magnitude and relative positions of terrestrial objects are ascertained, which by some authors are so ostentatiously paraded and lengthily dwelt upon as to obscure the results for the attainment of which alone they are of any value to the geographer, are always kept in due subordination. In like manner he has avoided the error of enlarging his geography with population statistics, an error into which the combination of ethnography was most likely to have led him. Lastly, Professor Ritter has taught us to make a new use of antiquarian research for the purposes of geography; to avail ourselves of the light thrown by speculative men, philologists and others, of late years, on the modes of thought of ancient peoples--their ways of conceiving natural objects--in order to

understand aright the fragmentary geographical notices they have left us. All these merits, which are comparatively indistinctly recognized in the large work of Ritter, have pervaded and animated his lectures; his printed works have owed part of their influence to the existence of a class of geographers prepared by his oral tuition to understand their full scope and bearing. And the revolution he has effected in the form, arrangement, and terminology of geographical science is the proof of the value of his mode of teaching.

Both of the works which have suggested the preceding observations are works of merit; though neither of them, tried by the standard we have set up, will be found to give entire satisfaction. They have, however, one recommendation not unfrequent in the best works of the old geographical school to which they in a great measure belong—conciseness and condensation. This is a feature which the new school would do well to appropriate. The habit of oral communication by lectures has in its founder favoured that habit of diffuseness alluded to above in speaking of his great work upon Asia; and in this respect too many of his disciples have emulated and surpassed their master.

The little text-book of M. le Chaix does not call for lengthened remark. It evinces extensive, and in general exact, knowledge of geography in the author, and considerable literary talent in its composition; but it does not appear well adapted to convey to elementary pupils (for whose use it is destined), a just idea of the object of geography, or to prepare them for the independent prosecution of geographical studies. It is a *catalogue raisonné* of the larger and smaller regions and districts of the globe, not a view of the earth itself as a whole, and of the structure and combinations of its subordinate parts. It is calculated for little more than the cultivation of a word-memory. The pupil upon whose memory it has been thoroughly impressed may be a walking dictionary of geographical nomenclature, without having a true and distinct image in his mind of any one of the hills, rivers, plains, or regions, the names of which he can rehearse so glibly. This defect is attributable not so much to the author—evidently a man of natural ability and fair acquirements—as to the geographical school in which he has been trained.

M. Balbi's *Elements of Geography* are entitled to a longer notice, longer indeed than our limits will admit of. To this the merits of the work itself, and still more of the author, entitle it. A list of his published works appended to the manual now on our table, reminds us in good time that M. Balbi has for more than thirty-five years been an assiduous and indefatigable labourer in the fields of geography and statistics, and how much and how valuable matters he has contributed during that period to those



sciences. Without pretending to lay before the reader an exhaustive catalogue, we may be allowed to recapitulate the leading and characteristic works in the order of their appearance.

In 1808 M. Balbi published at Venice, "*A Politico-Geographical view of the actual Condition of the World on a New Plan.*" In 1817 he published in the same city his "*Compendium of Universal Geography*, adapted to the latest political arrangements, and the most recent discoveries, with systematic tables of the principal languages, and dissertations on the population of the five parts of the world." In 1817 he also published a tabular view of the actual condition of the globe in one sheet. In 1818 he published, still at Venice, "*Elements of Geography for the use of young people.*" The only publications of M. Balbi that appeared during the year 1819 were new editions of his *Compendium*, and the *Elements of Geography*.

During the years 1820-22 (inclusive), circumstances confined M. Balbi's general and particular labours in a great measure to Portugal. A tabular view of the political and statistical state of Europe was published by him at Lisbon in 1820. In 1822 he published "*Politico-Statistical Varieties relating to the Portuguese monarchy,*" and "*A Statistical Essay on the Kingdom of Portugal and Algarvé, compared with the other states of Europe; to which is added a view of the actual state of science, literature, and the fine arts among the Portuguese of both hemispheres.*" Both of these works were published at Paris.

An "*Ethnographical Atlas of the World, or a classification of ancient and modern peoples, according to their languages*" (a volume of plates in folio, and a volume of letter-press in octavo), was published by M. Balbi at Paris in 1826. His "*Political Balance of Power,*" for the use of statesmen, young people, and men of the world, published (also at Paris) in 1828, was originally intended to form part of the preceding book, but appeared ultimately as a separate and independent work. In 1827 M. Balbi published a "*Historical and Statistical Essay on the Kingdom of Persia;*" in 1828 "*The French Monarchy compared with the Principal States of the World;*" in 1829 "*The Russian Empire compared with the Principal States of the World;*" and in 1831 an "*Essay, Historical, Geographical, and Statistical, on the Kingdom of the Netherlands;*" all more or less upon the same plan as his works on Portugal.

The year 1831 was an epoch in the literary labours of M. Balbi. At the death of Malte Brun, the "*Abrégé de Géographie Universelle*" in the course of preparation by that eminent geographer, was left unfinished. The completion of the work was intrusted to Messrs. Larénaudière, Huet, and Balbi. The two first were charged respectively with the divisions of "*The History of Geo-*

graphy and Ancient Geography," and "Descriptive Geography." "The General Principles of Geography" fell to the lot of our author. This commission was the virtual recognition of M. Balbi as the only competent successor to the illustrious dead in the department of systematic geography in the literary world of Paris.

M. Balbi has not rested on his laurels. To say nothing of numerous new editions of his earlier publications both in French and Italian, he has published, in 1837-42, his "Abridgment of Geography, compiled on a new plan, according to the latest treaties and most recent discoveries; to which is added an alphabetical index that may serve as a substitute for a geographical dictionary;" and in 1841-42 he published "Essays, Geographical, Statistical, and various," a collection of almost all his contributions to periodical publications since the year 1828. The "Elements of Geography" appeared in 1843; and the veteran has other works in preparation—"The Preponderating Powers of the Earth: a comparative statistical view of the five great European Powers, and the United States;" and "Italy within its natural Limits; as a description geographical and statistical of Italy and its geographical dependencies."

The titles of M. Balbi's works would of themselves be almost sufficient to indicate to a reader tolerably versant with modern geographical literature, the school to which he belongs. It is a school which regards geography as interesting only in so far as it is useful to the statesman, the warrior, or the merchant, and makes comparatively little account of it for itself. The earth is to the disciples of this school a mere theatre for politicians and soldiers, or for the enterprising speculator. The human interest preponderates in their estimation, and they are always tempted to substitute for the description of land or sea, tables of population, estimates of manufacturing and agricultural wealth, or classifications of men according to their creeds, and nations according to their forms of government. All these favourite topics are doubtless interesting, and a knowledge of them extremely useful, but geography they are not. And so completely is the geographical subordinated to them by writers of this school, that they scarcely attempt a connected view of the system of the earth's surface—the mutual relations of its heights and depressions—the analogy or diversity of the structure of its different regions—their respective characteristic features.

To this school M. Balbi belongs, though he does not carry its distinguishing peculiarities to excess. It will have been seen from the subjects on which he has published, that political and statistical details possess more interest for him than pure geography, that the latter requires the spice of the former to have a relish for him, and engage his continuous attention. Even in the preface to his

Elements of Geography this is apparent, from the emphasis with which he dwells upon population statistics. But still pure geography is not so undervalued by M. Balbi as it has been by some of his *collaborateurs*. He can appreciate the comprehensive views of a Humboldt, and present luminous views of the earth as a connected and continuous surface. He does not deem it sufficient to present a meagre catalogue of places with their respective bearings and distances. He conveys to his readers images of the structure and appearance of the country. The circumstance which renders it necessary to classify M. Balbi with the geographers of the old or statistico-political school, is the fidelity with which he has clung to their classification. What he has learned from the new has been cut up and distributed among the arbitrary categories of the old school; he has not sufficiently imbibed the spirit of the new for it to give form and coherence to his views—to teach him a new arrangement. He attempts to convey an abstract or general notion of the earth before he makes the reader acquainted with its component parts; and he then proceeds to describe minutely less the various regions of the earth than portions of the abstractions he has placed in its stead. There is consequently a deficiency in reality and unity about his descriptions: we have, it may be, all the parts, but still they do not make one whole.

Again, we would repeat, to prevent misapprehension, that our object in these remarks is simply to record our dissent from the school to which M. Balbi must be considered as on the whole adhering. Of the high talents and accomplishments of M. Balbi there can be no question, any more than of the important services he has rendered to general science. If we could grant that his was the true way to compose a system of geography—or an introduction to geography—we must at once admit that it was as nearly perfect as can well be conceived. M. Balbi's facts are elaborated with much research and critical judgment—they are important—there is nothing superfluous or trifling about them—and in arranging and expressing them the author shows himself to be a literary artist of the highest class. Elegant, instructive, and truthful, as compendiums of varied stores of knowledge, Balbi's "*Abrégé*," and "*Éléments*," are invaluable. They are indeed more valuable to the accomplished geographer or statist than the tyro; for they are repertoires of information of that kind which it is most difficult to retain in the memory with accuracy, and in which the slightest inaccuracy may vitiate a whole chain of investigation. The "*Abrégé*" ought to be constantly at the geographer's hand in the closet, and the "*Éléments*" ought to be his travelling companion.

In the brief notice of M. Balbi's works, already alluded to, as



appended to the "*Elémens*," he adverts to the frequent plagiarisms of which he has been made the victim. This he does not without cause, for no author has been so shamelessly and so injudiciously plundered by the book-making hacks of the present day. They have taken estimates and calculations from his works which were accurate at the time they were made, or as accurate as the *data* at that time attainable admitted of; and they have given them as strictly correct at much later periods, when they had become inapplicable. They have stolen injudiciously, without knowing what was worth stealing. When reproached with their plagiarisms some of them have unabashedly replied that they were compilers, and that M. Balbi himself was no more. To this shameless plea M. Balbi returns an answer well worthy the attention of the manufacturers of cheap and popular books, and their indiscriminate patrons:—

"As for the argument that we ourselves, in what we present as original facts, have made use of data either already known, or for which we are indebted to the courtesy of our *collaborateurs*, we reply once for all:—The originality of a work consists not in the creation of all its elements, but in discovering them in obscure collections, unpublished manuscripts, or the conversation of distinguished men; in re-uniting them when they have been scattered in twenty or a hundred different works; in verifying them; in pruning them of all that is erroneous; in stating them, so as to render them available for the purposes of comparison, which they seldom are; in arranging them; in filling up *lacunæ*, or indicating where they exist; in a word, elevating the formerly dispersed and disregarded materials to the dignity of a science. This has been the aim of all our labours: and if it shall happen to us in our turn, that equivocal facts, or facts valueless for want of proper combination, are to be extracted from our writings to be refuted or turned to better account—honour to him who performs the task: it is not against him that our complaints will be directed."

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## MISCELLANEOUS.

### I.—*Overland Journey from Sydney to Port Essington.*

IN the first session of the Legislative Assembly of New South Wales, a Committee, appointed to inquire into the feasibility of the project, reported in favour of a money-vote to defray the expenses of an overland journey from Sydney to Port Essington. The Assembly, in consequence, voted 1000*l.* for this purpose. The vote was disallowed by government; but the undertaking has not been allowed to drop. It has been taken up by private enterprise, as will appear from the following extracts from two Sydney papers:—

*“ Expedition to Port Essington.*—Dr. Leichardt, a gentleman of scientific attainments, who has been about two years in the colony, during which time he has been actively employed in collecting specimens of natural history in the northern districts, has determined to make an attempt to proceed overland to Port Essington. His party will be but small, not consisting of more than six persons; and his supplies will be carried on pack-horses, it being evident that in bush-travelling any sort of vehicle must cause great delay. As no public money will be applied for, the charges will be heavy if suffered to fall entirely on Dr. Leichardt; and any person who may feel disposed to assist in the object, can do so either by a subscription in money or supplies. The party will start in about ten days, it being desirable, if possible, to arrive at the end of the journey before the tropical rains set in. An application has been made to the directors of the Hunter River Steam Navigation Company to give the whole of the party a free passage to Moreton Bay, which, considering the object in view, we trust they may be induced to do, as it will save a tedious journey of several hundred miles. While we cannot but repeat our opinion of last year, that the government was highly to blame for refusing the 1000*l.* voted by the Legislative Council for the purpose of fitting out an expedition to proceed to Port Essington, we are pleased to find that individual enterprise is about to undertake a measure of such deep importance to this and the neighbouring colonies.”—*Sydney Morning Herald.*

*“ Trip to Port Essington.*—In our previous notice of this subject mention was made of a gentleman properly qualified to undertake the expedition, and who was about to start overland for Port Essington. The gentleman to whom allusion was made is Dr. Ludwig Leichardt, known to many persons in Sydney as a very successful lecturer on botany. Since the time when he appeared in this capacity, Dr. Leichardt

has been engaged in a scientific exploration of the country between Sydney and Wide Bay, to the north of Moreton Bay. He has recently returned from that journey, bringing with him an immense collection of specimens of every kind—plants, wood, shells, recent and fossil rocks, reptiles, wild fruits, gigantic bones, &c. This collection is in many respects perfectly unrivalled; and in one division alone, that of botany, we understand he has discovered upwards of one hundred new plants. His geological labours have enabled him to follow a complete section to Wide Bay; and the result of his industry will shortly be made known through the medium of either a German or English scientific periodical. It will be then seen what has been going on, whilst some have little dreamed of it. In the course of his journey, Dr. Leichardt has, of course, come into contact with numerous tribes of aborigines. With them he lived peaceably, employing them frequently in his service. Even the wildest of the Myall blacks—fellows as ferocious as cannibals usually are—learned to appreciate him; and though for a long time they could not comprehend his operations on the stones, tapping them with his hammer and putting them into his bag, yet they found out that he was an extraordinary character, and, from his medical attentions to them, a person far beyond themselves. Hence they became his friends: and we have been told that, where another white man would have been swallowed, the doctor was safe and unharmed. His skill, patience, and tact thus enabled him to go alone and undefended into the haunts of savage men, and to pursue his avocations at his ease. The adventures which befel him in his long and perilous journey would, we doubt not, form an interesting volume. It is not our business to intrude into his own province, and imperfectly touch upon what he will, we trust, himself lay before the public. It is sufficient for us to be able to assure our readers that the adventures of this enterprising man are singularly characteristic, and that they prove him to be a person well calculated to battle with the difficulties which would, doubtlessly, await any one who should attempt the overland route. Cool, determined, considerate, and full of that patient untiring energy which is so material a part of the German character, Dr. Leichardt is, of all men we have seen, the best fitted to enter upon this arduous duty. His plans at present are, we presume, not matured; but it is said that he will very shortly set out for his new destination. Not accounted from the public purse—not encumbered by a useless retinue of followers—but alone, or with one or two trusty friends, without weapons of offence, armed chiefly with his hammer, and determined to investigate all he sees—this resolute individual will, if his life be providentially spared, accomplish single-handed what many, whom we are acquainted with, declare to be impossible. Time will determine.”—*Australian*.

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II.—*South Australia.*

SOME discoveries have been made by whalers in the western part of South Australia, which add to the information respecting that region communicated in Mr. Eyre's reports and journals. The extent and value of the new information will perhaps be most correctly indicated by reprinting here:—1st. A report drawn up by the editor of the '*Southern Australian*,' from the verbal communications of Richard Harris, one of the whalers—2nd. A report, drawn up by Mr. Smith, resident magistrate at Port Lincoln, from the verbal communications of George Cummings, Harris's companion—3rd. Some remarks, by the editor of the '*Southern Australian*,' upon the seeming discrepancies of the two statements. East of Adelaide an instructive excursion has been made by Governor Gawler across the Murray, and as far as the valley of the Glenelg, connecting the labours of Mr. Tyers with the observations in the Adelaide district.

## I.—STATEMENT OF RICHARD HARRIS.

"We have received, from rather an unexpected quarter, a valuable and interesting contribution to the geography of the country to the westward of Port Lincoln.

"We have just conversed with a person named Richard Harris, now in the employment of the Surveyor-General, who, in the end of August last, along with his mate, George Cummings, performed the arduous journey by land from a whaling station at Fowler's Bay to Port Lincoln.

"Calculating the distance at 200 miles, and that they would get supplied at Peters' Islands and at Streaky Bay, where there were whaling stations, they took with them ten days' provisions. At Peters' Island they got a chart of the coast, which was of the greatest service. On arriving at Anxious Bay they got tired of keeping to the coast, where they had difficulty in getting water, and hoping also to shorten their way, they struck off at the salt lagoon, called by Mr. Eyre Lake Newland, and held a due E. course into the interior. This course they kept for two days, over sand-hills and a scrubby country, when they came to a high conical hill, with good grass on it and good soil. They found also at intervals granite rocks, near which they always found water. When at the coast they thought this mountain very near, but found it to be two days' journey, or about 50 miles. It is probably Mount Wedge of Mr. Eyre, but at a greater distance than he placed it, judging by the eye. They now found the country to the E. and S. of the finest description. They encamped near a stream of considerable size, which ran to the S.W. From the hill they saw the bluff near Waldegrave Isles, and, being afraid that they would lose themselves if they went farther into the interior, they determined to travel again by the coast, and cross over to Port Lincoln from Coffin's Bay. On descending, they came to a plain which extended in breadth as far as the eye could reach. This plain was covered with such rich green grass that, as Harris ex-

pressed it, he almost imagined himself in a fine grazing farm in England. The sward was very close, and the grass was half up his leg. The soil is a dark loam. They were sure they had come near a station, having never been in this colony before,\* and they constantly broke out into expressions of delight with the scenery. They travelled through this vast plain for two days, and found the country equally good all the time, but there are very few trees. They also found a great many pools or lagoons of fresh water, which were large, deep, and apparently permanent. They were constantly in the expectation of killing ducks in the pools, but were unsuccessful. They succeeded, however, in killing a large brown kangaroo, which was exceedingly agreeable, as their provisions had just failed them. This they roasted, and it served them the rest of the way. At the end of two days they came to a belt of scrub with grassy spots here and there which continued to the sea-shore. They journeyed from sunrise till sunset, with two hours' rest, in a straight line, taking their course from the sun, so that they must have walked 25 miles per day. The fine plain they mention is, therefore, about 50 miles in length, and the breadth unknown.

"They saw only seven natives, two of them, stout made men, they met before they came to Mount Wedge, who kindly showed them a water hole.

"Mount Wedge is placed by Mr. Eyre in lat.  $33^{\circ} 30'$  S., and long.  $134^{\circ}$  E., but from Harris's statement we should say it is farther to the N.W.

"We have looked at Flinders' chart to ascertain if there is any anchorage between Waldegrave's Isles and the shore, but find he had made no soundings. We perceive, however, a sounding of 10 fathoms close to the S. end of the large island. If there was safe anchorage, with such a good country in the neighbourhood, it would be an admirable place for a settlement.

"It is remarkable that after all the explorations that have been made, and all that has been said about Port Lincoln, so little in reality is known of the large district westward of it. Southward of the Gawler Range discovered by Mr. Eyre, and bounded by the ocean and the line of country on Spencer's Gulf, there is a compact district of a triangular form, nearly equilateral, measuring 160 miles each side, or about 13,000 square miles in extent, which has never been penetrated except by these adventurous whalers.

"We sincerely trust that the opening now almost providentially made, may lead to the most cheering and important results."

## 2.—STATEMENT OF GEORGE CUMMINGS.

*"The new discovery to the westward of Port Lincoln."*

"Gentlemen,—Previous to reading Richard Harris's account of his journey from Fowler's Bay to Coffin's Bay I had heard from his fellow-traveller, George Cummings, a verbal statement, which differs in some few particulars from that of Harris.

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\* The three whaling stations mentioned above were occupied by parties from Hobart Town, from which our travellers had last come.

"From Harris's account it would seem that they never left the coast till they reached Anxious Bay. The fact is, according to Cummings, that, from the sand-hills at the N. side of Streaky Bay, they saw an apparently open country running from the E. end of the Bay. Arriving there, they left Mr. Eyre's track, which was distinctly marked, and took a south-easterly course, which brought them to Mount Cooper (Mr. Eyre's course having been S.W. to a spring marked on his chart, and then S.E. till he reached Lake Newland"). This was a distance of about 50 miles, and Cummings describes it as an open grassy country, though they did not see any water. At Mount Cooper they fell in with several small streams, from which they filled their water-kegs, and proceeded on to Lake Newland, where they again fell in with Mr. Eyre's tracks. There they met with four natives, two of whom ran away, and the other two showed them a spring of fresh water, which is probably the one laid down by Mr. Eyre near Lake Newland. From hence they continued along the coast for two days over sand-hill and scrub, but, on arriving at the S.E. point of Anxious Bay, they took an easterly course into the interior, which brought them, in two days more, to the mount which Harris calls a conical hill, and which Cummings describes as resembling a wedge; one end, towards the S.E., being a high bluff, and gradually falling in the opposite direction. The country they passed over from Anxious Bay to Mount Wedge was a fine open country, with high grass and well-watered, and it was here they found the pool of which Harris speaks. This country answers Harris's description, except that, instead of wandering in this vast plain two days, it occupied them three, when they encamped at the junction of three or four streams which take their rise on the S.W. side of the Mount. At the base of Mount Wedge Cummings says they saw pines of a large size. Leaving the Mount, they took a direct southerly course, which brought them to Point Drummond, where they joined the Governor Gawler, and sailed in her to Port Lincoln. From Mount Wedge till within a few miles of the coast near Point Drummond, they found the country undulating, grassy, and well watered, lightly timbered with she-oak. If you look at Mr. Eyre's chart, you will see that a due easterly course from Lake Newland would not reach Mount Wedge, which makes it probable that Cummings's account is the correct one. But he quite agrees with Harris as to the kind of country they saw; and he says he frequently expressed to his fellow-traveller his surprise that such a beautiful country was unoccupied. In all directions round Mount Wedge, the country had the same appearance of open grassy land lightly timbered. Mr. Eyre places Mount Wedge in  $33^{\circ} 30' \text{ S.}$ , and  $135^{\circ} 20' \text{ E.}$ , not  $134^{\circ} \text{ E.}$ ; but Cummings, on examining the chart here, thinks it is in  $33^{\circ} 40' \text{ S.}$ , and  $135^{\circ} 30' \text{ E.}$  However Cummings and Harris may differ in details, they agree in the main, that they discerned an excellent country of great extent, grassy, and well watered; and this, I trust, will be the means of inducing the Government to send a party to explore, and make charts of, a country doubtlessly good, very little known, and very much required. Indeed, if his Excellency intends (as I am informed he does) to visit Port Lincoln, he will have an excellent opportunity of judging for himself,

\* To prevent misunderstanding, we beg to correct a trifling error here. Mr. Eyre arrived at Lake Newland from the opposite direction to that here stated.



and adding to our very imperfect knowledge of the geography of a very important portion of our beautiful province.

"I am, Gentlemen, your obedient servant,

"MATTHEW SMITH.

"*Gaulter-place, Adelaide, Dec. 18, 1843.*"

### 3.—REMARKS OF THE EDITOR OF THE 'SOUTHERN AUSTRALIAN.'

"Mr. Smith notices discrepancies between the statements of the two parties; but a little explanation from us may, perhaps, go far to put matters to right. We found Harris to be rather a silent man, and he spoke principally in answer to our questions, and, as we only examined him upon the subject of the good country and as to his route after he left Lake Newland, we did not ascertain the fact of his having struck into the interior from Streaky Bay, and of his visit to Mount Cooper, so that here Cummings's statement is additional—not different. The same may be said of the rest of Cummings's statement, and it is, therefore, a valuable addition to that of Harris. Mr. Smith states, in his letter, that an easterly course from Lake Newland will not strike Mount Wedge. On referring to the large map, taken from Mr. Eyre's original tracings, we find this to be a mistake, as the Lake and the Mount are nearly in the same latitude; and if the departure was taken from a spot near the S.E. end of the Lake, the travellers, by holding a due E. course, would strike the very centre of the Mount. We find that by a typographical error Mount Wedge was, by our account, placed in long.  $134^{\circ}$ , in place of  $135^{\circ}$ , the meridian line of which last passes over it. We should also have said that Mount Wedge is farther to the north-east, in place of north-west, than Mr. Eyre placed it; but Mr. Smith and Cummings must be wrong in placing it so far to the E. as  $135^{\circ} 20'$  or  $30'$ , as a 'direct southerly course' from these points would have taken a traveller much nearer Slesford Bay than Point Drummond. We had almost forgot to mention that the apparent discrepancy of Mount Wedge being called conical by one, and like a wedge by the other, is easily reconciled, because it might have been conical on one side and like a wedge on another. It may or may not be wedge-like, but we understand it was named after a Mr. Wedge, of Van Diemen's Land."

### III.—*Progress of Discovery in the Middle Island of the New Zealand Group.*

THE narrative of an exploring party from Nelson, published in the first part of the present volume, threw some additional light on the conformation of the land on the S. side of Cook's Strait. The four short papers which we have here classed under the above title render that information more precise, and carry it further into the interior. The account of Mr. Cotterell's route connects the valley of the Waimea, opening into Tasman's Gulf, with the valley of the Wairau, opening into Cloudy Bay, by

an inland route; and the details are given with considerable precision. The report of Messrs. Heaphy and Spooner carry us from the western extremity of Mr. Cotterell's route southward into the interior. The report of Mr. Tuckett connects the starting point of the two preceding routes with the upper waters of the Pelorus, leaving a very inconsiderable tract to be explored in order to connect them with the Wairau valley explored by Mr. Cotterell.

A pass by which there is easy access from the valley of the Pelorus to that of the Wairau has since been discovered.

The route described in the fourth paper crosses an elevated range of rather peculiar geological construction, a continuation of the high land of which Mount Arthur (above the line of perpetual snow) is a summit, from the Motuaka valley to a river which flows N. and S. into the Massacre Bay of Tasman—now more commonly called Coal Bay, from the large quantities of that mineral found in it. The impression produced by these papers is, that the district of the Middle Island of the New Zealand group, N. of a line drawn from Cape Campbell to Cape Ferdinand, is the N.W. declivity of a huge mountain mass, and is surrounded by the three principal valleys:—that of the Wairau, flowing into Cloudy Bay; that which contains the parallel sub-valleys of the Waimea and Motuaka, flowing into Tasman's Gulf; and the valley of a nameless stream, the embouchure of which was seen by Dumont D'Urville, immediately N. of Cape Ferdinand, together with a number of lesser valleys.

1.—*Mr. Cotterell's Route from the Waimea to the Wairau Valley.*

"November 17th, 1842. The distance performed this day was 6 miles in all: the first 4 miles in the direction of S.S.W.; the remaining 2 miles in the direction of S.W. The course of the first four miles proceeded along a branch valley of the Waititi, which had an average width of 10 chains, expanding at its eastern extremity to a small plain of 300 acres. From this valley the route ascended to a table-land, and descended thence into a second branch valley of the Waititi, 40 chains in breadth and bearing fine grass.

"18th. The distance performed this day was 10 miles: 3 miles in a W.S.W. direction; 2 miles S. and W.S.W.; and 5 miles S.S.E. The first 3 miles brought the travellers over a hill covered with fern and manuka into the main valley of the Waititi. The valley was wooded and 30 chains in width. Where the river was struck its course was from S.E.; but it appeared to issue from a narrow gorge in the mountain-range to the E.N.E. Two miles from where the Waititi was crossed, passing along a high range of hills, a river was seen to the W., judged to be the Motuaka. Following an intermediate valley for 5 miles S.S.E., brought the party into the Motuaka valley. The hills on either side were very high, and covered with flax and fern; the width of the valley 80 chains; the soil was poor, bearing grass.

"19th. The direction of the route appears to have been S.S.E. throughout the day; the distance was 10 miles. Two miles brought the party to the gorge through which the river issued from the mountain-range noticed above as extending in the E.N.E. quarter. On reaching the gorge they ascended the hills on the W. bank, preserving the same direction. At a distance of 3 miles they discovered a pass in the mountain-range. They entered a forest of black birch, which obstructed the view; but before entering observed a river to the W., which appeared to issue from the pass. Proceeded 5 miles through the wood.

"20th. Continued 12 miles in a S.S.E. direction, still in the wood (which consisted of black birch), and reached the mouth of the pass.

"21st. Ascended 5 miles (2 miles in a S.E. and 3 miles in an E. direction) through the pass; gained the summit-level, and saw water flowing to the E. Descended in an E. direction, and soon issuing from the wood, entered upon a grassy valley 40 chains wide. A large river, judged to be the Wairau, was flowing through it. There was a range of snow-topped mountains on either hand. A thick forest of black birch extends W. of the Wairau. After reaching the summit-level the party advanced 8 miles—the bearings are not given. The whole progress made during this day was 13 miles.

"22nd. This day 10 miles were accomplished in a N.E. direction. In the course of the day a low range of hills crossing the valley, and through which the river has formed a pass, were surmounted. Below them the bed of the river is close under the hills on the N. side of the valley. The river was crossed with difficulty at this point.

"23rd. Eleven miles were accomplished this day in a direction of N.E. by E. A river issuing from a gorge S.S.W. of the valley was crossed at 1 mile. The valley is crossed by another low range of hills, through which the river has formed a pass. Below this the width of the valley is  $1\frac{1}{2}$  mile (the river occupying half a mile); and it appeared to increase in width as far as the eye could trace its course. The soil was to some extent thin and stony, but in parts covered with luxuriant grass. Some flax was seen.

"24th. Struck off towards the hills on the S., but found only a succession of hill-ranges. Returned to the valley lower down: where it was left in the morning there were flax-swamps. At the point returned to the valley had narrowed to a mile in breadth, and the river was flowing on the S. side. The distance travelled this day was 22 miles, but no bearings are given.

"25th. The direction throughout the day was E. by N.; the distance accomplished was 22 miles. At the end of the first 3 miles a large valley and river joined that of the Wairau. Below this point the main valley increases in width, and has on either side tributary grassy valleys, well watered and separated by grassy hills of gentle elevation. At the termination of the day's journey the width of the valley had increased to 10 miles.

"26th. The distance performed this day was 18 miles, in a general direction of S. by E. The coast was reached after walking 12 miles over a rich alluvial deposit and extensive mud-flats encroached on by the tide. The alluvial land is covered with milk-thistles and docks.



The plain, including the mud-flats, has a frontage of 25 miles. The river is navigable 10 miles into the interior. Its mouth is about the middle of the 25 miles coast line. After reaching the shore Mr. Cotterell proceeded 2 miles along the beach in the direction of E.S.E.; and then striking inland in the direction of S. by E., reached the river Kipari-te-Hau (where he crossed and encamped), after walking 4 miles. The land on the Kipari-te-Hau is described as a beautiful undulating plain, richly covered with grass, and free from fern and bushes, and the terminus of a valley extending far into the interior.

"27th. Walked 20 miles: 10 miles E. by S.; 6 miles S.E.; and 4 miles of which the direction is not mentioned. The route for the first 10 miles lay across low undulating hills, bearing grass, to a lagoon. A fine valley was then ascended for 6 miles, at the end of which the sea on the S.E. coast was seen from the top of a high hill. A valley was then descended for 4 miles to a place where an encampment was formed at a distance of a mile from the coast. The high hills are thickly covered with grass and milk-thistle.

"28th. A walk of a mile in a S.E. direction brought the party to the sea-shore; they then proceeded 18 miles along the beach. The hills (white clay and sandstone) came close up to the coast-line.

"29th. Proceeded 15 miles further along the coast, at the foot of hills of the same character as those past on the previous day. Ascended the range at night and encamped.

"30th. Regained the shore after having ascertained that the interior, like the coast, was an uninterrupted succession of impracticable hills. Walked along the shore 10 miles to the bank of a deep and rapid river which was not fordable. This river Mr. Cotterell was informed is called the Waipopu: its mouth is said to be 20 miles N. of Lookers-on. This was Mr. Cotterell's farthest. To this point he had travelled by estimate in all 198 miles, in the course of 13½ days.

"On the 30th of November Mr. Cotterell returned 10 miles to the point where he struck the shore in the morning. On the 1st of December he continued his backward route along the shore, accomplishing that day 22 miles. On the 2nd he passed the point at which he struck the shore on the 28th, and afterwards turned Cape Campbell: the distance travelled this day is not given. On the 3rd he crossed the Kipari-te-Hau and encamped on the Wairau. On the 4th (Sunday) he returned to Kipari-te-Hau; whence he sailed in a whale-boat on the 6th to Cloudy Bay. On the 7th he left Cloudy Bay in the same boat, and arrived at Nelson on the 11th. The distances travelled and the appearance of the country are not noted after the 1st of December."

## 2.—*Report of an Expedition to Explore to the South-west of the Nelson Settlement.\**

"According to the testimony of the natives of the Motuaka, and others who had formerly inhabited the interior of this island, there exist

\* The 'Nelson Examiner,' speaking of this narrative, says:—"There is yet a large tract of country to explore between the Motuaka and Massacre Bay; and we understand it is the intention of Mr. Heaphy to endeavour to penetrate to the Takaka by the Rewaka. The Maori path from hence to Port Cooper is said by the slaves at Motuaka (who belong to the tribe dispossessed of that and the Waimea district some years since

plains of grassy land within about 4 days' journey of Nelson, and situate between the Lake Rotuiti and the western coast. Through these plains a river was reported to flow, unconnected with the Motuaka, and to join the sea near Cape Foulweather.

"To ascertain the truth of these reports we started from Nelson on the 8th of November, with the intention of traversing the country described, and of penetrating it by a westerly route from the source of the Waikea, or from the Rotuiti Lake. We took with us three men and twenty days' provisions, with plenty of powder and shot, as we knew that it would be necessary to depend greatly on our gun for support.

"During the 9th and 10th, travelling over the ridges between the Waikea and Motuaka rivers, our progress was much impeded by the wet weather and swollen streams.

"On the 11th, from the ridge between the Motuaka and Wairau Pass rivers we could see the great snowy range of the Motuaka continuing to the southward on our right, and debarring our progress to the westward, according to the original intention. We determined, therefore, to proceed to the Rotuiti Lake, and to follow one of the streams flowing thence to the southward.

"The nature of the land here has been before described; we may say, however, that it consists of barren gravel, in the form of steep ridges running N.W. and S.E. In the two valleys of the Motuaka and Wairau Pass river there is much good pasturage.

"Encamped on the evening of the 11th at the edge of the great wood in the Wairau Pass valley.

"Detained by rain during the following day, November 12th.

"*November 13th.*—Heavy snow and rain. In the evening proceeded about 3 miles into the great wood, when we halted, our feet being benumbed with walking through the snow, and one of the party being seriously indisposed.

"The soil in the great wood is of much better quality than that on the fern ridges. It is of decayed vegetation on gravelly red clay. From the snow continuing on the ground during this and the following days, we imagine that the elevation is too great for successful cultivation.

"*14th.*—Continued on through the wood in a direction S. by W. until we came to the Wairau Pass, thence S., through deep moss and thick underwood, which caused our progress to be both slow and fatiguing. Encamped in the wood. Distance about 9 miles.

"*15th.*—Followed the same course through the wood, in much thick jungle, and occasionally over tracks of fallen timber. At length emerged upon some swampy ground to our right, and from the side of a steep hill saw the Rotuiti Lake before us, filling up the whole of the gorge to the southward. On our right an open valley extended to the W.N.W., apparently covered with grass, agreeing with the natives' description. After having been in the wood for upwards of two days, the sight of this valley was particularly pleasing, and the change of temperature from

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by the present Motuaka natives, with the assistance of Rauparaha) to be up one of the valleys which run into the upper part of the Wairau. Mr. Cotterell was of opinion that the second opening from the pass led to an open country, which is probably the one in question."

that of winter to warm sunny weather was equally pleasurable. We named the valley that of the 'Fox' river; the Rotuiti Lake, 'Lake Arthur;' and a sharp snowy peak to the S. 'Mount Cotterell,' being the one most probably ascended by that gentleman. Having descended the hill, and followed the course of the valley for about 3 miles, we found that a river ran through it from the western end of the lake, coinciding with the description given by the natives. The soil in this high part of the valley is not good, being very stony and covered with high grass and spear-plant, with patches of high manuka. Where we encamped, however, which was in a birch forest to the right of the valley, the soil was a good brown loam. The valley at its commencement is not more than a quarter of a mile wide, but at our encampment its width is nearly a mile. Distance to-day about 8 miles.

"16th.—Descended the valley, and found the pasturage gradually improving, and the width of the valley increasing. In consequence of the river (which is here impassable), approaching close to the hill side, we had to ascend the latter, and from the summit saw the valley continuing about 7 miles farther, when the river seemed to enter a gorge of the mountains and flow to the S.W. North of us we could see the hills above Nelson and the Motuaka; to the E., the Wairau Pass and Lake Arthur; to the S., five steep wooded ridges, and above them the snowy range; and, to the W., the great range extending from Separation Point to the Gorge of the Fox.

"About the lower part of the valley there is a considerable quantity of table-land, mostly wooded, and some on a lower elevation fit for pasture. The soil is much better in this part of the valley than at its commencement; it is not, however, we imagine, fit for agriculture, except about the wooded land on the table-flats. The mountain we ascended we named 'Mount Sykes;' and the various tributaries of the river we named after the gentlemen who were massacred at the Wairau. The valley widens occasionally to about 3 miles, and again contracts, making it average about  $1\frac{1}{2}$  mile in breadth. The pasture much improves towards the lower end of the valley.

"On stopping to encamp this evening we met with Mr. Boys and two men, who had been sent by Mr. Tuckett to explore in the same direction, and had penetrated through the woods by compass from the Motuaka survey station. They had just descended into the valley.

"17th.—Mr. Boys being of the same opinion as we, that level land could only be found to the westward, we joined company and followed the valley for about a mile to its termination, where the river entered a steep gorge and turned sharply to the S.W. To continue down this ravine, we had alternately to walk in the river's bed and to ascend the steep sides of the hills. The scenery in the Devil's Grip, the name given to this defile, is very picturesque, but nothing more can be said in its praise. At each bend of the river we were in expectation of seeing the valley expand, but were as often disappointed.

"In the bed of the stream, by the side of which we dined, we found some pieces of coal, similar to that from Massacre Bay.

"In the afternoon we continued descending the ravine, amid heavy rain, and halted near the junction of the Fox with another large river flowing from the southward, and probably from the great lake. The



Fox is here too rapid to ford, or we might have ascended this river. Its banks are extremely mountainous; and, from native report, the land around the large lake is worthless. Distance 10 miles.

"18th.—Continued our progress down the river Fox, which here (increased by the junction of the river before mentioned and other tributaries) forms the largest mountain river which we have seen in New Zealand. As we descended the gorge the sides became steeper, and the river occupied the whole of the breadth of the ravine, obliging us to keep to the hill sides, which were thickly covered with wood, and occasionally almost perpendicular.

"At noon, despairing of the ravine widening, we ascended a mountain of considerable elevation, and from a tree discerned the river widening to S.W. for about 12 miles, bounded with rugged mountains, the most remote of which might be about 25 miles distant. Being assured that this defile could lead us to no level land for the distance above named, and that any good land which might surround the Fox at the coast would be quite out of reach from Nelson, we thought it unnecessary to proceed farther.

"We might have followed the river to the coast, but were prevented by want of provisions. In the commencement of the expedition we had been much retarded by unfavourable weather. In crossing a swollen stream one man had lost his footing, and the provisions which he carried were damaged; and another man had to be left behind at the lake on account of serious lameness. Our stock of provisions was thus so diminished that, for our return, we had to depend almost entirely upon a few charges of powder and shot.

"During the 18th, 19th, 20th, 21st, 22nd, and 23rd, returning over the same ground to Nelson.

"The river which we found flowing to the westward is evidently the Kawatiri of the natives. It flows from the lake, and passes through some grass-land, which, in an exaggerated sense, they term a plain. In the valley we found some remains of Maori huts; and in one place a path, which we endeavoured to follow.

"The valley of the Fox is about 11 miles in length, and averages  $1\frac{1}{2}$  mile in breadth. In it there may be about 11,000 acres of pasture land. It offers a fair locality for a stock station, within three or four days' walk of Nelson, and would depasture about 15,000 sheep at present. In the event of stock being put upon it, the pasture would rapidly improve; and were the seed of artificial grasses scattered about, it would become soon an excellent piece of pasture land.

"The land generally which we have seen is quite unfit for agriculture; and where the soil is of a better description it is at too great a distance from the town for profitable cultivation.

"Beyond the southern ranges which we saw there may be some level land, but it will be in the neighbourhood of Banks' Peninsula, and quite divided from the Nelson settlement; and the only way in which it is possible to reach it easily from Nelson must be through one of the southern openings from the Wairau, and thence by the eastern coast to the southward.

"CHARLES HEAPHY.

"November 29, 1843.

"J. SWINTON SPOONER."

3.—*Report of an attempted Journey to the Wairau, Dec. 1843.*

"On Tuesday, the 28th of November, we left Nelson, proceeding up the Maitai valley and crossing the mountain range at its head. Descended to the bank of the river Oyerri, thence following its course towards the coast, with the intention of gaining the mouth of the river Kaituni, and, by the course of the valley through which it flows, arriving at the Wairau: this route having been recommended as eligible and available for the construction of a line of road from hence to the Wairau district, and a portion of it (as far as the Oyerri) already explored by Messrs. Parkinson and Drake, who on this occasion were my guides, they having been recently conducted thither by two Maories, residents at the Kaituni.

"We were accompanied on this journey of exploration by Messrs. McDonald, Newcombe, G. Tytler, and Kerr. Impeded by the usual difficulties which attend the traverse of a mountainous and forest country, and yet more by the inability of some of the party to sustain the fatigue of such an expedition, as well as by the casual occurrence of heavy rain on Thursday night, which, rapidly raising the waters of the Oyerri, rendered it difficult and somewhat hazardous to cross and re-cross that river, and disappointed in not being met as we had anticipated by Maories from the Kaituni to conduct us by their route, *ours* was necessarily devious, and our progress through an uninterrupted forest so slow that on arriving, on Friday morning, unexpectedly at the bank of a river flowing from the N.W. and uniting with the Oyerri, and as large or larger than the latter, we were compelled, by fear of continued rain and our diminished stock of provisions, to abandon the further prosecution of our contemplated journey. I have no doubt but that we were then within a distance of half a day's journey from the valley of the Kaituni, and that, had we kept on the eastern side of the Oyerri, from which we had recently crossed through the river to avoid the steep land which then occurred, we should have accomplished our design.

"Returning reluctantly, with lightened burdens and increased confidence, we easily walked in two days a distance which, in going forward, had occupied three; and from the river Oyerri over the mountain to Nelson we returned in one day, Sunday, December 3rd.

"No doubt but that, on a second attempt, and especially if assisted by Maori guides, it would be practicable to walk from hence to the Kaituni in three days, and thence to the Wairau on the fourth day; and that, if a pathway were cut through the forest, the journey would then be easily accomplished in two days. I cannot, however, concur with Messrs. Parkinson and Drake in their opinion already expressed, that such is an eligible and available route for the construction of a line of road for cattle, for the following reasons:—

"1. The country is mountainous; the ridges not parallel with the course of the river, but intersected by it in their lower dips, and these so frequent that two ravines per mile probably occur on an average; and the sides of some of these are so steep and stony that a cattle-road could only be opened by constructing bridges across them.

"2. It is an uninterrupted growth of forest-trees, without any admix-

ture, as far as we have penetrated the forest, of what would afford sustenance for cattle on the journey.

"3. The river is absolutely unavailable as a means of transport upwards, even to a flat-bottomed boat; it is liable to frequent and sudden floods; the drift-wood is deposited on its banks at a height of 12 feet above its usual level.

"4. The available land on either side is of very limited extent: it would be difficult to select as much as 12 miles by  $\frac{1}{2}$  a mile, or less than 4000 acres; and this cannot be approached by the river, and by a road only at a cost in construction which the value of such district as an appendage to this settlement is too inconsiderable to justify.

"The available land does not slope away to the water's edge, but terminates generally abruptly with a steep face to the river, presenting an elevated terrace of land, varying from a quarter to half a mile in breadth, and backed by a mountainous elevation. Birch is the prevailing timber of the forest; but pine is also abundant, especially the variety called *remo*. The soil is for the most part a sandy loam, very similar to that which occurs on the western side of the Waititi valley, but of a redder hue, and less stony. We discovered no minerals; the rocks consist chiefly of laminated strata of soft micaceous stone, sometimes approaching to the character of slate, and of a hard formation, brittle in fracture, and sharp in its edge as flint, but possessing no degree of transparency.

(Signed)

"FREDERICK TUCKETT.

"*Nelson, December 5.*"

4.—*Notes taken on a journey between the Rewaka and Takaka\* districts, 1844.*

*April 25.*—Started at 10 A.M., in company with the Rev. C. Reay, Apiko, and two Maories, from Mr. Campbell's house, in the Rewaka. Ascending the hill at the back of his house, steering west by north, at half-past two we came to a range of hills, from whence we saw the Marahou valley, bearing north by east, and the Rewaka south by west. Passed Mr. Heaphy's track during the afternoon. Our road lay over hills easy of ascent, and in most cases open woodland.

*26th.*—Steered west half north for two hours. Passed over small rocks in ascending a range, between which, however, there is room for a bridle-road to be cut. At half-past two we got to the top of the Pukeona range, from which we had a very fine view of the Takaka river and valley immediately beneath us; and saw Mr. Duffey's survey-station about two days' journey down the river. Met with a deep chasm such as Mr. Heaphy describes. Descended the range till about six o'clock, without meeting with water.

*27th.*—In two hours we got to an open grass plain of about 500 acres in extent, through which the Takaka runs. The descent from the Pukeona range to the Takaka river is difficult, and would require a circuitous road to be cut to allow horses to descend; though not worse than what I apprehend some parts of the road from Wellington to Porirua

\* This is the route alluded to in the extract from the '*Nelson Examiner*,' at p. 347.



were to cut. The whole of our road was through a succession of dense forest land, generally free from supple-jack, in cutting a bridle-road through which few (if any) large trees would need to be felled. The ground is covered with thick moss and vegetable deposit. The view of the Takaka valley is magnificent: the banks of the river are clothed with timber; the land, of which there are some thousands of acres available for agricultural purposes, is generally flat, and of equal quality with the Motuaka woodland; the trees are chiefly remu, totara, and birch, many of them of very large growth; the river is rapid, and in many places very deep. From the banks of the river we observed the brown-looking peak so plainly visible at Motuaka, bearing south half west, Mr. Duffey's station distant a day and a-half's journey north, the ridge of the Pukeona down which we descended east, and the Takaka mountains west. We ascended the river all day, steering south, crossing at the fords. Towards evening we found that the river suddenly took a turn to the westward through a deep gorge. Steered eastward, and crossed a smaller river, the Mangaōna, which forms a junction with the Konganiho, and the two combined become what is called the Takaka. Encamped on the banks of the Mangaōna, and found in the bed of the river a good deal of lime and potter's clay. With the exception of the plain before mentioned, there is little or no grass land; but, owing to the open nature of the woodland, plenty of feed for a limited number of cattle could be obtained. The land generally is suitable for tillage, not for grazing.

28th.—Ascended another ridge of the Pukeona, on our return, steering south by east. Found the ascent very difficult, chiefly climbing over sharp ledges of slaty rock. The rain, which had been threatening some time, came down in torrents, accompanied with very high wind, during the night, and continued the whole of the next day, during which we made little or no progress.

30th.—The rain ceased about noon, when we started, steering east by south; our road was very difficult. By night we reached the summit of a high range of hills, forming one side of the Rewaka Bush Valley, as the natives call it, from which we had a glimpse of the Motuaka wood. Could not find water.

May 1st.—Descended the ridge, which was very steep and craggy, and came to what I imagine to be the source of the Rewaka river. Followed its course all day, the road almost impracticable, from having to walk on the edge of the river, which was very much swollen.

2nd.—Continued the same course, and at noon came to some Maori plantations. The whole of this southern branch of the Rewaka valley is grand in point of scenery, but utterly useless for agricultural purposes, the sides being almost perpendicular, and the only feasible road liable to be covered by every rain.

If a bridle-road be cut, I should recommend its being commenced at the hill which we ascended at starting, and continued along the road we traversed to the top of the Pukeona range, the descent from which, by proper search to the southward, I have little doubt would be found much more easy than the one we found. I consider that the whole distance of the bridle-road would not exceed twenty miles, taking into

consideration the circuit which would in places have to be made. The greater part of the road could be made at a trifling cost, and, when completed, might be traversed on horseback in one day. The opening a communication with so much really good land in the neighbourhood of suburban sections would be a very great advantage to the settlement at large.

GEORGE MURRAY.

*The Grove, Motuaka, May 3.*

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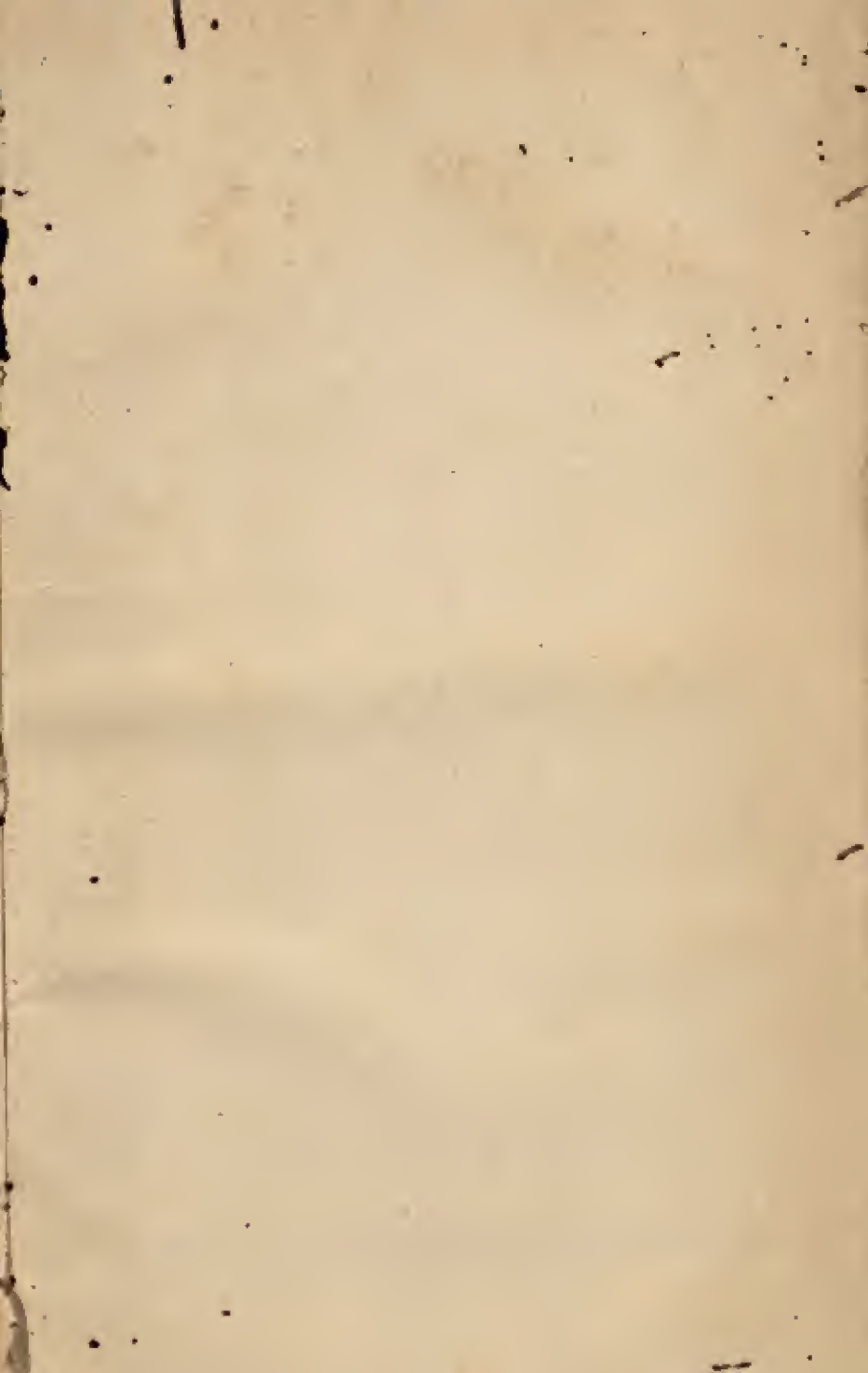
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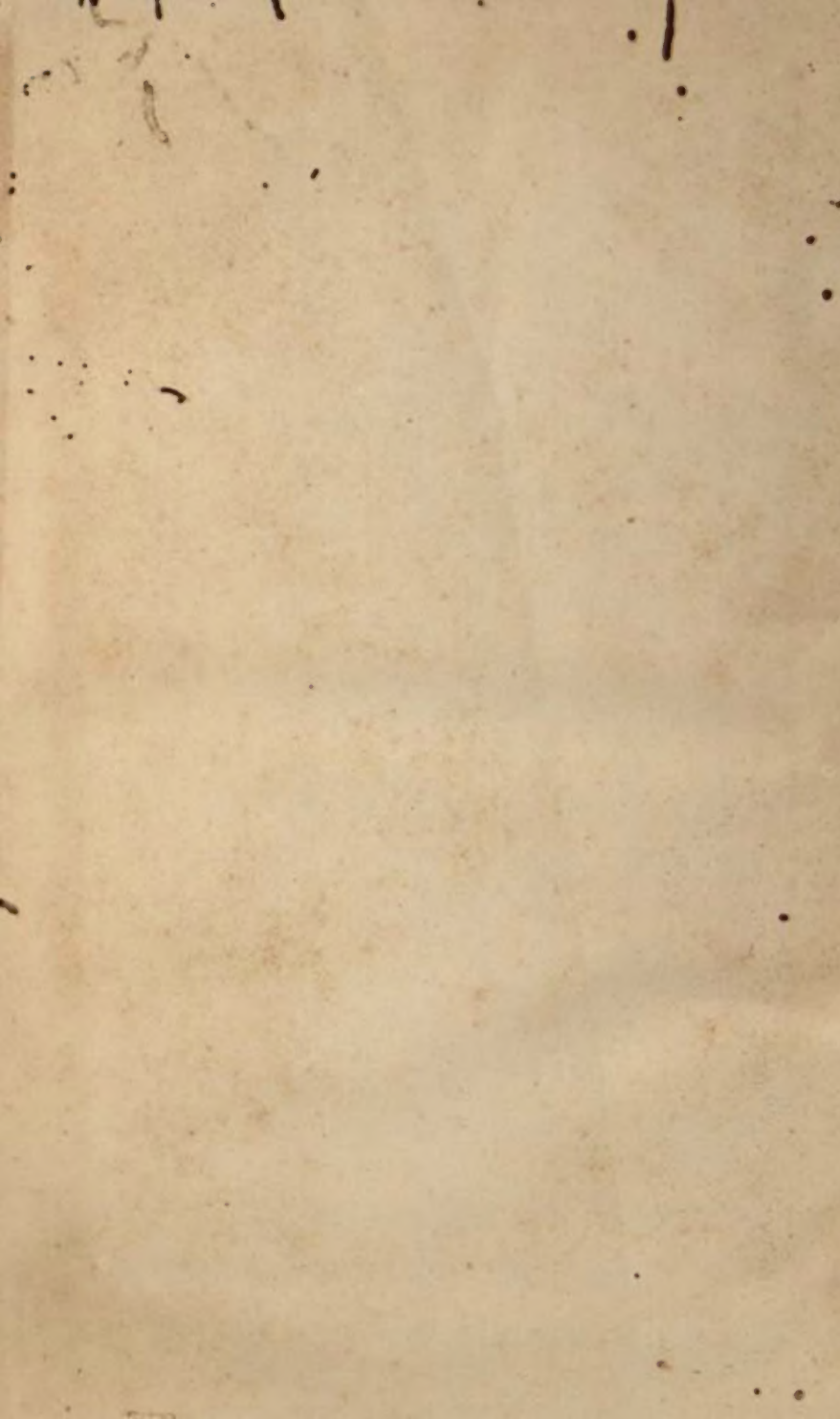
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